

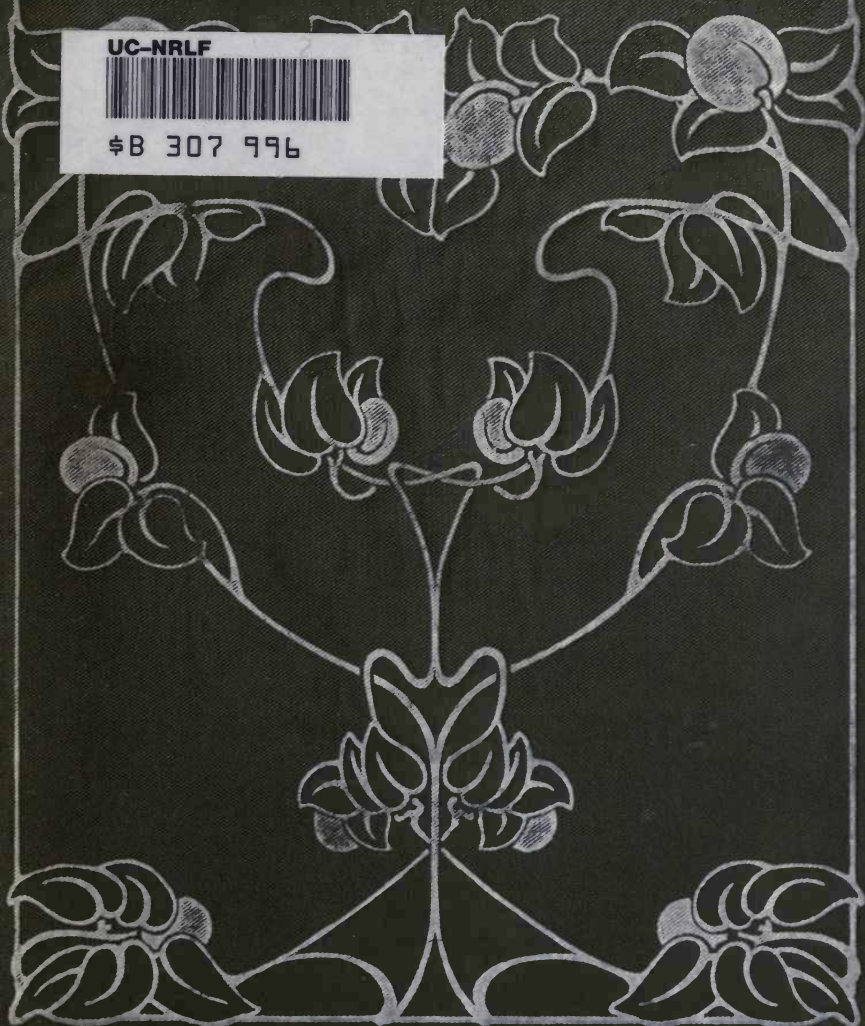
THE BOOK OF THE PEACH

H.W. WARD, F.R.H.S.

UC-NRLF



\$B 307 996





and is
NOT FOR SALE

*Subscribers wishing to purchase
copies of this book, new or second-
hand, should write to the Manager,
as other copies are available or will
be quickly obtained.*



THE LIBRARY
OF
THE UNIVERSITY
OF CALIFORNIA

PRESENTED BY
PROF. CHARLES A. KOFOID AND
MRS. PRUDENCE W. KOFOID

THE BOOK OF THE PEACH.

BY THE SAME AUTHOR.

FLOWERS AND FLOWER CULTURE
(EVERY-DAY HELP SERIES).

6D. AND 1/-.



THE BOOK OF THE PEACH:

BEING A PRACTICAL HAND-
BOOK ON THE CULTIVATION
OF THE PEACH UNDER GLASS
AND OUT-OF-DOORS.

BY

H. W. WARD, F.R.H.S.,

FOR TWENTY-FIVE YEARS HEAD GARDENER AT LONGFORD CASTLE,
SALISBURY; AUTHOR OF "MY GARDENER" AND "THE BOOK OF
THE GRAPE," ETC.

WITH ILLUSTRATIONS.

THE WALTER SCOTT PUBLISHING
CO., LTD., LONDON AND NEW-
CASTLE-ON-TYNE. 1903.

But

INTRODUCTORY.



DURING the twenty-five years for which I presided over the Longford Castle gardens, Salisbury, I was a pretty regular and successful exhibitor of collections and single dishes of choice hothouse and wall fruits at the annual summer and autumn shows held at the Crystal Palace and leading provincial towns, and the peaches and nectarines in the Longford collections always excited favourable comments on the part of experts.

I also grew peaches and nectarines very extensively on a goodly portion of the 1700 yards of brick walls, from nine to twelve feet high, which were available for the growth of choice stone fruit and pears, the gardens being enclosed and intersected with walls to such an extent as to divide the kitchen garden into several sections, thereby affording a variety of aspects for growing certain kinds of fruit trees. About 250 yards of these walls were covered with trees of select varieties of the peach and nectarine, these being furnished from bottom to top with plenty of young, healthy, fruitful

wood every year—trees which never failed to yield good crops of fine fruit year after year during the whole period I was at Longford; the trees, as well as the heavy crops of prize-winning fruit which they annually bore, commanding the admiration of all fruit-growers and owners of gardens who saw them from time to time, the trees and fruits cultivated under glass eliciting equally complimentary remarks. Therefore, in these flattering circumstances, I have been asked by horticultural friends and others interested in the cultivation of the peach to put into book form the practice that succeeded so admirably in this connection at Longford, a request with which I have great pleasure in complying, in the hope that the cultural remarks herein detailed may lead to a more general and extended cultivation of the peach and nectarine, not only in the gardens of the rich, but also in those attached to the villa-mansion downwards, in England, Scotland, Ireland, and Wales.

With this object in view, I have arranged the cultural work and other matter under separate headings and in due order, so that those wishing to consult these pages on any particular point of cultural treatment have only to refer to the contents to find the desired information. In the course of my gardening practice, I have made many and various experiments in cultural methods of pro-

cedure, as well as in testing novelties in the way of new fruits, flowers, and vegetables. I have also always held fast to those varieties and to the *modus operandi* which have proved to be good.

The cultural details are set out in as plain, simple, and concise a manner as possible, consistent with making my meaning clear. Thus the instructions given in the work come within the comprehension of all consulting its pages, from the schoolboy upwards.

I hope this work may be received by those interested in the subject of which it treats in the same kindly spirit that induced me to write it; also that the unavoidable references to the success which I achieved in the culture of the peach may not be put down to egotism.

In conclusion, I wish to express my indebtedness to the editor of the *Gardeners' Chronicle*, for permission to use electros of fruits, leaves, etc., not otherwise obtainable; also to Messrs. Thomas Rivers & Sons, Messenger & Co., Wrinch & Sons, Mr. Charles Turner (Slough), and Mr. W. Duncan Tucker, for their kindness in lending the electro-blocks which illustrate this work.

H. W. W.

LIME HOUSE,
RAYLEIGH,
May, 1903.

wood every year—trees which never failed to yield good crops of fine fruit year after year during the whole period I was at Longford; the trees, as well as the heavy crops of prize-winning fruit which they annually bore, commanding the admiration of all fruit-growers and owners of gardens who saw them from time to time, the trees and fruits cultivated under glass eliciting equally complimentary remarks. Therefore, in these flattering circumstances, I have been asked by horticultural friends and others interested in the cultivation of the peach to put into book form the practice that succeeded so admirably in this connection at Longford, a request with which I have great pleasure in complying, in the hope that the cultural remarks herein detailed may lead to a more general and extended cultivation of the peach and nectarine, not only in the gardens of the rich, but also in those attached to the villa-mansion downwards, in England, Scotland, Ireland, and Wales.

With this object in view, I have arranged the cultural work and other matter under separate headings and in due order, so that those wishing to consult these pages on any particular point of cultural treatment have only to refer to the contents to find the desired information. In the course of my gardening practice, I have made many and various experiments in cultural methods of pro-

cedure, as well as in testing novelties in the way of new fruits, flowers, and vegetables. I have also always held fast to those varieties and to the *modus operandi* which have proved to be good.

The cultural details are set out in as plain, simple, and concise a manner as possible, consistent with making my meaning clear. Thus the instructions given in the work come within the comprehension of all consulting its pages, from the schoolboy upwards.

I hope this work may be received by those interested in the subject of which it treats in the same kindly spirit that induced me to write it; also that the unavoidable references to the success which I achieved in the culture of the peach may not be put down to egotism.

In conclusion, I wish to express my indebtedness to the editor of the *Gardeners' Chronicle*, for permission to use electros of fruits, leaves, etc., not otherwise obtainable; also to Messrs. Thomas Rivers & Sons, Messenger & Co., Wrinch & Sons, Mr. Charles Turner (Slough), and Mr. W. Duncan Tucker, for their kindness in lending the electro-blocks which illustrate this work.

H. W. W.

LIME HOUSE,
RAYLEIGH,
May, 1903.

CONTENTS.

	PAGE
INTRODUCTORY - - - - -	vii
THE CULTIVATION OF THE PEACH AND NECTARINE	
UNDER GLASS AND OUT-OF-DOORS - - -	1
SHAPE, SIZE, AND ASPECT OF THE PEACH-HOUSE -	5
CONSTRUCTION OF PEACH-HOUSES - - -	8
ON HEATING PEACH-HOUSES - - - -	18
TRELLISES FOR PEACH TREES - - - -	24
VENTILATION - - - - -	27
SUITABLE COMPOSTS FOR PEACH TREES - -	30
MAKING THE BORDERS - - - - -	31
SELECT VARIETIES OF THE PEACH - - -	35
SELECTION OF TWELVE VARIETIES OF THE PEACH -	40
SELECTION OF SIX VARIETIES OF THE PEACH -	41
SELECT LIST OF NECTARINES - - - -	41
SELECTION OF SIX VARIETIES OF NECTARINES -	45
PEACH LEAVES - - - - -	46
FREESTONE AND CLINGSTONE PEACHES AND	
NECTARINES - - - - -	47
DEMAND AND SUPPLY OF RIPE FRUIT - - -	49
DATES ON WHICH THE HOUSES SHOULD BE CLOSED	
FOR FORCING - - - - -	51
PLANTING THE TREES - - - - -	52
PRUNING AND TRAINING THE TREES—FIRST YEAR -	56
PRUNING AND TRAINING THE TREES—SECOND AND	
SUBSEQUENT YEARS - - - - -	58

	PAGE
ATMOSPHERIC MOISTURE - - - -	59
ATMOSPHERIC TEMPERATURE - - - -	61
SETTING THE BLOSSOMS - - - -	62
WATERING THE BORDERS - - - -	63
DISBUDDING - - - -	65
THINNING THE CROPS - - - -	68
EXPOSING THE FRUITS TO THE SUN - - - -	71
SHADING NECTARINES FROM THE SUN - - - -	71
GUARDING AGAINST RIPE PEACHES BEING INJURED IN FALLING OFF THE TREES - - - -	72
PACKING PEACHES - - - -	73
PEACH TREES IN POTS - - - -	75
PEACH GROWING FOR MARKET - - - -	86
MARKETING THE FRUIT - - - -	89
PROVIDING UNDERGROUND RAIN-WATER TANKS - - - -	90
PEACH GROWING ON THE OPEN WALLS - - - -	92
RETARDING THE FLOWERING PERIOD - - - -	95
PROTECTING THE FLOWERS FROM FROST - - - -	96
WATERING WALL TREES AT THE ROOTS - - - -	101
THE REMEDY FOR APHIDES ON TREES OUT-OF-DOORS - - - -	102
RED SPIDER ON TREES OUT-OF-DOORS - - - -	103
BUSH PEACH AND NECTARINE TREES IN THE OPEN - - - -	103
VARIETIES TO BE GROWN IN THE OPEN - - - -	108
DISEASES AND INSECTS - - - -	108
GUMMING - - - -	109
MILDEW - - - -	109
BLISTERED LEAVES - - - -	110
APHIDES - - - -	111
RED SPIDER - - - -	112
BROWN SCALE - - - -	113

LIST OF ILLUSTRATIONS.

	PAGE
PORTRAIT OF AUTHOR - - - - -	<i>Frontispiece</i>
1. COMPOSITE FRUIT, PART PEACH AND PART NECTARINE - - - - -	3
2. PEACH AND NECTARINE FRUITS ON SAME BRANCH	4
3. LEAN-TO PEACH-HOUSE WITH FRONT VENTILATING SASHES - - - - -	7
4. RANGE OF LEAN-TOS, WITH ORCHARD-HOUSE IN CENTRE - - - - -	9
5. THREE-QUARTER SPAN PEACH-HOUSE - - -	10
6. SPAN-ROOFED PEACH-HOUSE WITH VENTILATORS IN BRICKWORK - - - - -	11
7. SPAN-ROOFED PEACH-HOUSE WITH FRONT VENTILATING SASHES - - - - -	12
8. FRUIT AND FLOWERING SHOOT OF EARLY RIVERS NECTARINE - - - - -	42
9. PEACH LEAF WITH GLOBULAR GLANDS - - -	46
10. " " KIDNEY-SHAPED GLANDS - - -	47
11. FREESTONE PEACH - - - - -	48
12. HALF CLINGSTONE PEACH - - - - -	48
13. TRUE " " - - - - -	49
14. BEARING SHOOT OF PEACH - - - - -	59
15. " " WITH BUDS - - - - -	65
16. PEACH-HOUSE AT SCONE PALACE, PERTH - - -	76
17. SECTION OF PEACH-HOUSE AT SCONE PALACE - - -	77

	PAGE
18. HALF-STANDARD TREE OF THE ALEXANDRA NO- BLESSE PEACH - - - - -	81
19. A PYRAMID OF THE RIVERS' EARLY YORK PEACH	82
20. CRIMSON GALANDE PEACH - - - - -	83
21. BLOCK OF PEACH-HOUSES FOR MARKET PURPOSES	85
22. GLASS COPING - - - - -	99
23. THE IMPROVED WALL FRUIT PROTECTOR - - -	100
24. EARLY RIVERS NECTARINE IN THE OPEN AT LANGLEY - - - - -	104
25. PEACH LEAF ATTACKED BY "BLISTER" FUNGUS -	110
26. TRANSVERSE SLICE OF A HEALTHY PEACH LEAF	111
27. TRANSVERSE SLICE OF AFFECTED PEACH LEAF -	111
28. ASCI AND SPORIDIA - - - - -	112

The Cultivation of the Peach and Nectarine under Glass and Out-of-Doors.

THE PEACH.

(*Amygdalus Persica.*)

THE Peach, as the specific name implies, is of Persian origin, and was introduced into Egypt during the reign of Cambyses. It passed into Greece, and subsequently reached Italy shortly before the Christian era. It found its way into England much later. There is no more luscious and refreshing fruit in the summer and early autumn months than a good, well-ripened peach, and during those months no dessert is complete that does not include a dish each of peaches and nectarines. Therefore the wonder is that the peach and nectarine are not grown much more extensively in favourable situations out-of-doors throughout Great Britain and Ireland than they are,

seeing that suitable aspects are available for the growth of the trees and ripening of the fruit in every walled-in garden in every county and village in the United Kingdom, and that the culture and special requirements of the trees during the whole period of growth are easy and simple when properly understood by the cultivator; and it is with a view to impart a practical knowledge in this direction to those not already acquainted with the subject that this small work has been written. Statements have occasionally appeared in the horticultural press to the effect that the present generation of gardeners do not understand the culture of the peach as well as their forefathers did. Others attribute the cause of the peach and nectarine not being grown so extensively as the merits of the fruits entitle them to be to the fact—the *assumed fact*—that this fickle climate of ours is not so favourable for the successful cultivation of the peach in the twentieth century as it was some fifty or sixty years ago. However, I look upon these assumed causes or apologies for peach trees being conspicuous by their absence in so many walled-in gardens in this country as being more imaginary than real, no reason whatever existing to prevent good crops of peaches, large in size and fine in quality, being obtained in every walled-in garden in these islands, in which a south, west, or

even an eastern aspect can be afforded the trees, the trees being confined to walls or fences having south and west aspects in northern counties. Still the fact remains that for some cause or other this choice and much-prized fruit is not cultivated so extensively as its merits and easy culture un-



FIG. I.—COMPOSITE FRUIT, PART PEACH AND
PART NECTARINE.

^{9.} doubtedly entitle it to be. However, let us hope that the claims of the peach and nectarine to the foremost place among stone fruits will receive due attention at the hands of cultivators in the near future and henceforth, and we trust that the cultural remarks herein made may help to bring about this very desirable result.

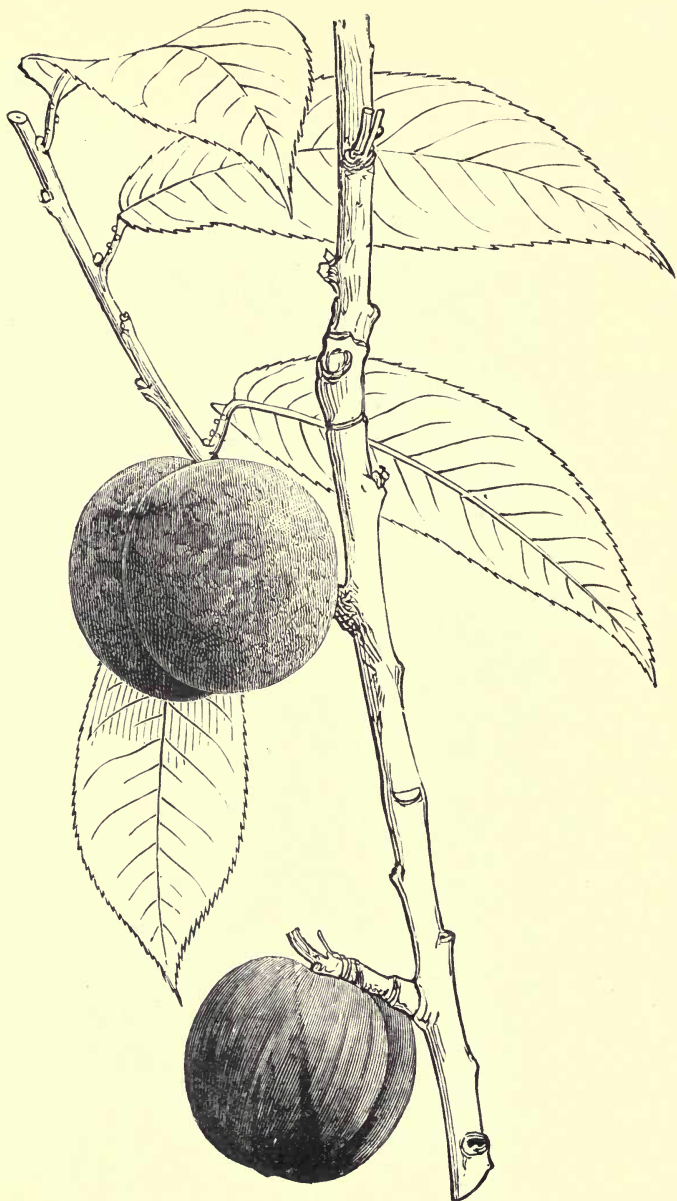


FIG. 2.—PEACH AND NECTARINE FRUITS ON SAME BRANCH.

The peach and nectarine require the same cultural treatment, therefore the remarks herein made on the peach will apply equally to the nectarine. Although there is a great difference between the fruits of the peach and nectarine in size, colour, and flavour, the distinction ends here, inasmuch as in habit of growth, size, form, and colour of leaves the trees of both are identical; but, unlike all other kinds of fruit whose seeds may be relied upon to reproduce trees or plants of the respective kinds, a peach-stone is as likely as not to produce a nectarine, and *vice versâ*. (See Figs. 1 and 2. Fig. 1 represents a composite fruit, part peach and part nectarine; Fig. 2 represents a peach and nectarine fruit on the same branch.) Hence it is that quantities of both species have to be raised by budding them on the plum stock.

SHAPE, SIZE, AND ASPECT OF THE PEACH-HOUSE.

The shape and form of the peach-house, as well as the aspect, should be determined by circumstances. They may vary as much as do the taste and means of the individual owners, and yet be capable of producing first-rate crops of high-quality peaches. The plain and cheap, but nevertheless substantial, structure will, under the same conditions, yield crops of peaches and nectarines as good and satis-

factory in every way as will the more expensive and ornamentally constructed peachery. But where wall-space having an aspect facing due south, south-east, or south-west is available, there is no more suitable description of peach-house for the production of early peaches—that is, peaches to be ripe at the end of April or early in May—than that known as the “lean-to” (see Figs. 3 and 4). Of course, peaches to be ripe during June and the four following months may be and are successfully grown in the same description of houses—lean-to’s. A house having a south-east aspect is preferable to one facing due south for the production of early peaches, inasmuch as the roof-glass will be fully exposed to the sun’s rays from the time the sun rises late in the morning until it goes down early in the afternoon during the winter and early spring months: a period of time when the trees, being forced, derive—as they do during the summer months—great benefit from the combined influence of increased light and a more genial atmosphere resulting from the sun-warmed houses.

The next best form of peach-house for walled-in gardens is that known as “hip-roof,” or “three-quarter span” (see Fig. 3). This shape of house is absolutely necessary where only low walls are available in order to secure a proper length of rafters and consequently due trellis space for the trees to extend their growth on. This description of house affords

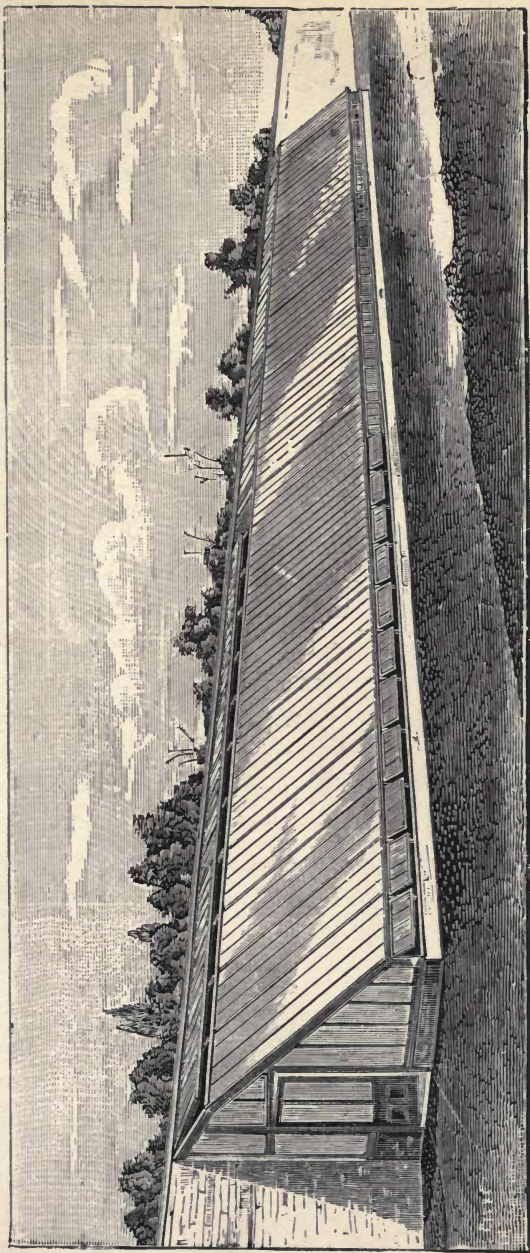


FIG. 3.—LEAN-TO PEACH-HOUSE, WITH FRONT VENTILATING SASHES.

more light to the interior through the back roof than would be obtained in the case of a "lean-to" house.

In both, front ventilation may be admitted through continuous front glass lights worked by machinery, or the front ventilation may be effected by a series of boxes built in the front brickwork, and regulated by either sliding or hanging shutters (see Figs. 4 and 5). The top ventilators should open the full length of the roof by machinery—Wolland's continuous ventilating gear is all that can be desired in this direction.

Another structure is that known as the span-roofed house (see Fig. 6). This should run north and south, so as to admit of the trees trained up under both roofs sharing equally the benefit of the sunshine throughout the day from the end of March onwards. The span is invariably used for the production of fruit, both early and late in the season, where no wall-space is available for the lean-to or three-quarter span. The span-roofed structure has much to commend it to those interested in the production of all kinds of fruit and most kinds of plants, not only on the score of economy, but also from a cultural and productive point of view.

CONSTRUCTION OF PEACH-HOUSES.

Should the site whereon it is proposed to erect the peach-house, or a block of peach-houses, as the

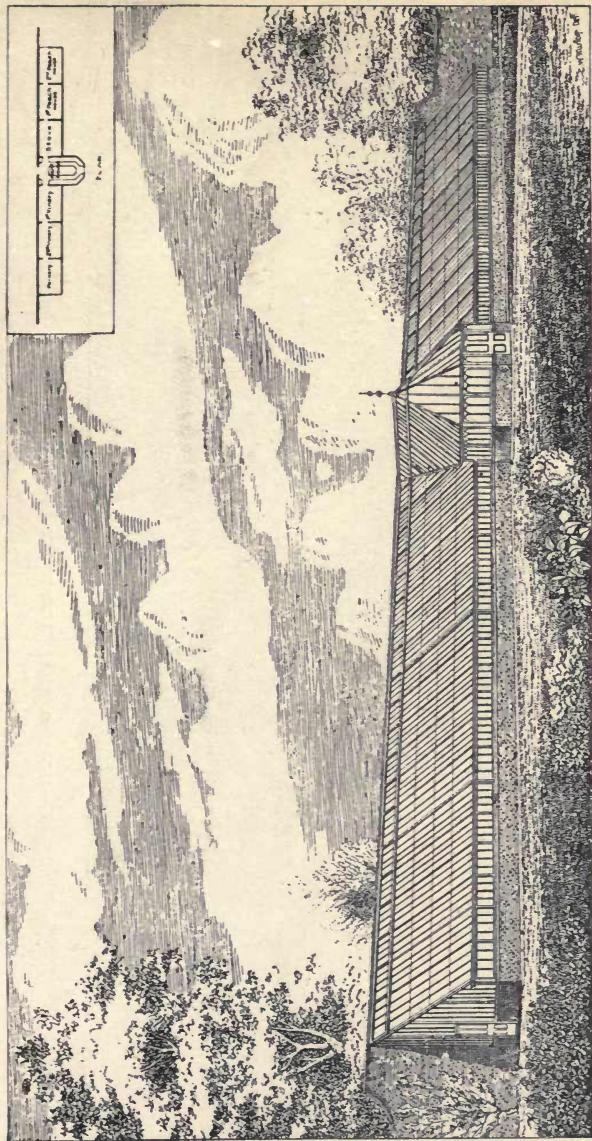


FIG. 4.—RANGE OF LEAN-TO PEACH-HOUSES, WITH ORCHARD-HOUSE IN CENTRE.

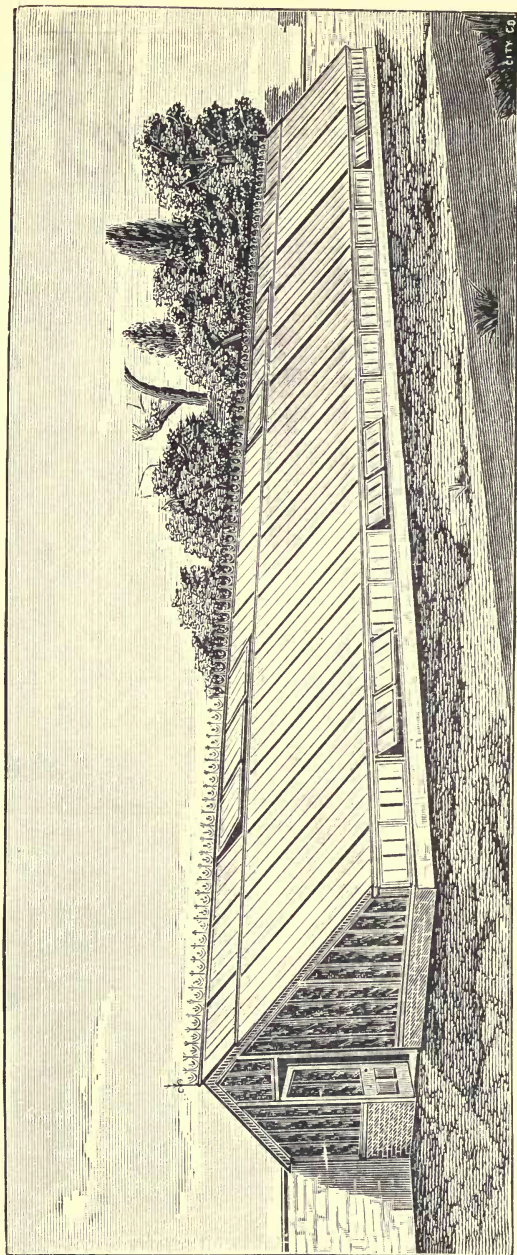


FIG. 5.—THREE-QUARTER ROOFED PEACH-HOUSE.



FIG. 6.—SPAN-ROOFED PEACH-HOUSE, WITH VENTILATORS IN BRICKWORK.

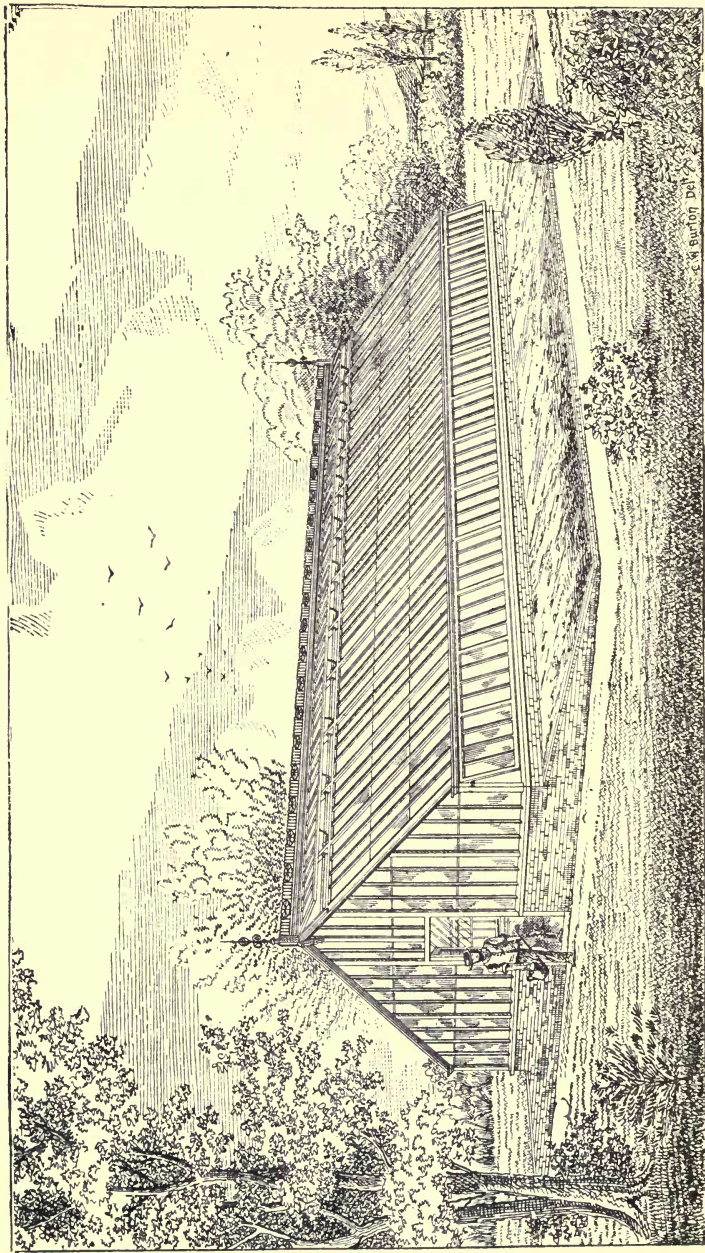


FIG. 7.—SPAN-ROOFED HOUSE, WITH FRONT VENTILATING SASHES.

case may be, be near the highest known water-line in that particular part, and there is no choice of sites, it will be necessary to allow for this closeness to the natural water-level in constructing the houses by having one or more steps, according to circumstances, leading up to the house, or houses, from the ground-line outside, so as to permit of the base of the border being made above the ascertained water-level, thereby preventing the possibility of the roots of the trees being submerged at any time.

Before erecting a peach-house, as in the case of other fruit-houses, the individual family requirements must be considered of the particular fruit which the house about to be erected is put up to grow, and the house must necessarily be large enough to supply the demand for the produce grown therein, the demand governing the question of supply and consequent glass accommodation.

However, where it can be done, a good-sized forcing house, liberally supplied with four-inch hot-water pipes, should be erected in preference to a low, narrow, and consequently short-raftered structure, which means a too restricted growth in the trees and fewer peaches. Therefore, a lean-to peach-house should be about sixteen feet wide inside between the front and back walls, the latter being, say, fifteen feet high, and the height of the front sashes from one and a half foot to two feet,

the length being anything between thirty and two hundred feet, according to circumstances. A house of these dimensions will afford a roof angle of about thirty-five degrees to the sun, and give a length of rafter of nearly twenty feet. Such a house affords ample scope to the trees to extend sufficient growth to maintain them in a vigorous, healthy condition. Instead of constructing the peach-house of sashes resting on heavy rafters, light rafters one and a half inch by three inches should be employed, these, in the case of span-roofed houses from sixteen to twenty-four feet wide, having rafters from ten to fourteen feet long, being strengthened by and nailed to purlines amid rafters and supported vertically by lengths of gas tubing one and a half inch in diameter (outside measurement), resting on brick or cement piers at intervals of ten feet, and having a Y-shaped piece, quarter inch by one inch, of iron inserted in the top to grip the purlines, which should be two and a half inches by three and a half inches, and bevelled to admit of the rafters resting properly thereon when nailed to them. Other items of wood necessary in the construction of a house of this description are as follow:—Wall and end plates, four inches by five inches; end-rafters, three inches by four inches. The rafters should be secured to the wall plates bottom and top. A piece of wood, two inches by three inches, bevelled

on one (top) side to the slope of the rafters, should be nailed on to the top of wall plate between each pair of rafters, and flush with the top surface of the latter and the inside edge of plating; these individual strips of wood should be rabbeted in a line with the bed of the rafters for the purpose of receiving the top squares of glass in the bays formed by each pair of rafters intervening between the individual ventilators. The latter should be worked, as already stated, by continuous ventilating gear. A capping, consisting of a piece of wood two inches by two inches, with the two upper angles slightly rounded, should be provided for securing the water-tight hinges of ventilators when fastened longitudinally on the upper surface of the rafters immediately under the coping. A drip, one inch by three inches; door-frames, three inches by four inches (the lintel being bevelled to prevent water lodging thereon), with oaken sills of the same size; doors, six feet six inches by two feet eight inches, the doors being either all wood or one-half made of glass, as may be desired, and hung on substantial brass butts and provided with either a brass mortice or galvanised rim lock and suitable furniture. The woodwork should receive two coats of good white-lead paint before being fixed, and another afterwards. Each house should be provided with a liberal supply of roof ventilators, these being hung in the manner indicated above at intervals

of three bays and worked throughout, as advised above, by continuous gear, having *curvilinear* lifting and lowering rods. The roof should be glazed with glass twenty-one ounces to the square foot, using panes eighteen inches wide and from eighteen to twenty-four inches long, the lengths of the panes being determined by the length of rafter used and the number of such stock sizes that are used without being cut. Then bed these in best white-lead putty, sprigged on top, putting four brass sprigs to each pane. In glazing, leave out the top panes in every fourth and fifth pair of rafters for the ventilators to cover when glazed with two squares same size glass, a transom, one and a half inch by three inches, being cut to fit in between and flush with both upper and lower surfaces of the rafters, so as to enable the ventilators to shut down quite close on them. Allow a lap of a quarter of an inch in glazing.

The brickwork prepared in readiness for the erection of the structure, which is now, so to speak, ready for fixing, should be—back wall from twelve to fourteen feet by fourteen inches up to within two feet of the top, when nine-inch work will be sufficient width. The recess thus formed will afford space for a row of strawberry plants, or tea-roses, in six-inch pots, to stand on during the process of forcing. A surface coating of cement should be laid

on the five-inch recess as much with a view to preserving the brickwork from the injurious effects of the water passing through the hole in the bottom of the pots when applied to the plants, as to produce an even surface on which to stand the pots level; front wall (where sashes are used to admit fresh air to the interior of the house in front), one and a half foot by nine inches, built on fourteen-inch footings.

In constructing a span-roofed house, of course, a ridge, one and a half inch by seven inches, will be necessary (this being grooved on both sides in a line with the bed of the rafters to receive the top square of glass); capping, one inch by five inches, with the upper angles slightly rounded, and an additional purline placed as recommended above—that is, in span-roofed houses having a width of from sixteen to twenty-four feet and a length of rafter from ten to fourteen feet. The width of spans, like “lean-to’s” and “three-quarter spans,” varies according to the requirements, as well as to the fancies and means of garden proprietors. However, a suitable size may be found in a structure twenty feet wide inside the walls, with front ventilating sashes one and a half foot deep and about three feet wide, so as to correspond with the width of the two bays immediately above them in the roof; the rafters being fourteen feet long, the lower

plate resting on a nine-inch wall, rising one foot above the floor-line of the house. This will give a clear space of nearly ten feet between pathway and the bottom of the ridge, and an angle of about thirty degrees to the sun. Span-houses should, as a matter of course, be provided with two sets of roof ventilators, these being hung from the ridge, on either side, at intervals of four bays, and the ventilators on one side should be fixed angle-wise to those on the other side, water-tight hinges being used for the purpose. The ventilators, as in the case of "lean-to's" and "three-quarter spans," should be regulated by Wolland's continuous opening gear, the front vents being also opened by machinery.

ON HEATING PEACH-HOUSES.

Where any extent of four-inch pipes—say from five hundred feet upwards—is to be heated, the horizontal tubular boiler is to be recommended, sizes being supplied by the makers of this description of boiler to meet special requirements in the matter of heating, as under:—

No. 1 size, with nine 3-in. pipes on top and three 3-in. pipes at sides.

Length of Boiler,

4 ft. 6 in.

.....

Heating power in
4-in. pipe.

750 ft.

ON HEATING PEACH-HOUSES. 19

No. 1 size, with three 3-in. pipes at sides of furnace and nine 3-in. pipes over fire-box.

Length of Boiler.		Heating power in 4-in. pipe.
A, 6 ft. 6 in.	.....	1100 ft.
B, 9 ft. 6 in.	.....	1300 ft.

No. 2 size, with three 3-in. pipes at sides of furnace and eleven 3-in. pipes over fire-box.

Length of Boiler.		Heating power in 4-in. pipe.
A, 6 ft. 6 in.	.....	1500 ft.
B, 9 ft. 6 in.	.....	2000 ft.

No. 3 size, with four 3-in. pipes at sides of furnace and eleven 3-in. pipes over fire-box.

Length of Boiler.		Heating power in 4-in. pipe.
A, 6 ft. 6 in.	.....	1600 ft.
B, 9 ft. 6 in.	.....	2200 ft.

The new pattern "Mammoth Rochford" Horizontal Tubular Boiler (with caulked joints).

Pattern No. 2.—Having seventeen 4-in. pipes over furnace and two 4-in. pipes each side of furnace.

Length of Boiler.		Length of Fire-box.	Heating power in 4-in. pipe.	
A, 7 ft. 0 in.	...	4 ft. 10 in.	...	2500 ft.
B, 10 ft. 0 in.	...	4 ft. 6 in.	...	3080 ft.
C, 15 ft. 0 in.	...	4 ft. 6 in.	...	3500 ft.
D, 19 ft. 0 in.	...	5 ft. 0 in.	...	4000 ft.

However, it would be advisable to have two 9 feet 6 inch long boilers capable of heating 2000 feet of 4-inch pipe each, set side by side, to heat 4000 feet of 4-in. pipe, in preference to depending upon one extra large boiler to do the same amount

of work, the boilers being arranged so that one or both could be worked together, according to circumstances, to heat the 4000 feet of 4-inch pipe attached thereto. I may add that the measurements of the hot-water pipes refer to the inside diameters of same. It is important in setting boilers in position on a solid bed of brickwork or concrete, that a proper rise from front of furnace to back should be allowed in order to secure a good free circulation of hot water from the boiler to the flow pipes, in which also a rise of half an inch should be allowed in each 9 feet length of pipe. Thus a rise of about 2 inches should be provided in fixing the bed for the 4 feet 6 inch boiler; 3 inches for the 6 feet 6 inch size; and 5 inches for the 9 feet 6 inch boiler; 8 inches in the 15 feet size; and nearly 10 inches in the 19 feet heating apparatus.

The tubular boilers—upright and horizontal—according to my experience of them, will last a lifetime, and that a long life too. In saying this I have in my mind's eye two or three upright tubulars which at the present time are apparently as good and do their work as efficiently as when placed in position forty years ago. In the case of small houses, there are various sizes and shapes of saddle boilers to choose from.

In heating forcing-houses it is good policy to provide them with a liberal supply of 4-inch pipes. It

is much better to obtain the necessary degree of heat in a house by means of a number of pipes moderately heated than by the use of fewer highly heated. Of course this increases the initial cost of the heating apparatus, but it would be more than compensated for by the economy in fuel, in heating the pipes moderately rather than to a maximum degree in order to get up and maintain the desired temperature. Moreover, the degree of heat thus acquired is necessarily more genial and less arid than that secured by highly heated pipes, in addition to which the heating apparatus is subjected to less strain in doing the work required of it.

Either socketed pipes with joints made of a few rounds of yarn and cement to finish off with, or plain-end pipes connected with india-rubber joints (rings) may be used. Both are effective and easily made joints; the india-rubber joints, if a little more expensive, are more easily made and quite as easy to take apart as to put together, which circumstance is an advantage worthy of consideration by those about to heat their houses by means of hot water, especially so in the case of leaseholders.

A "lean-to" peach-house of the description indicated above, should, if used to produce ripe peaches by the middle or end of April, have three flow 4-inch pipes in front and two returns running alongside the

pathway, three and a half or four feet from the back wall. A span twenty feet wide should have two 4-inch flows on each side, suspended by hooks made of bar iron quarter-inch by one inch, screwed to and gripping wall-plates, and one return, resting on bricks, on either side the central pathway, thereby conferring additional stability to the whole of the structure or series of structures thus attached to the hot-water pipes.

The cement joints, as already stated, are easily and quickly made in the following manner:—Some rope yarn, consisting of several plies, is cut into lengths sufficient to go round the four-inch pipe three times when placed in the socket. Two rounds of this are driven with the caulking tools into position round the end of the pipe close down to the socket, the two ends of the remaining round of yarn being brought together at and a little out from the top of the socket, so as to form an aperture. Several joints having been operated on in this manner, fill a half-pound or pound coffee-canister (with a lip formed thereto, and having a stout piece of wood attached to serve as a handle) with Portland cement made to the consistency of thick paint, and empty the contents through the aperture indicated into each joint prepared for its reception, so as to completely fill the vacuum between the second and third round of yarn, tapping each joint with the

caulking-iron as the work proceeds, more with a view to cause the liquid cement to fill the vacuum than to ascertain that no empty space remains in the joint being made. After the cement has partly set, the third round of yarn should be driven home, and the several joints faced with stiff cement, and so on until the pipes are all fixed, including, of course, the necessary connections and valves. A man accustomed to the work would make twenty joints in the manner described above in one hour. A throttle-valve should be put in each of the flow-pipes (where they branch off from the mains) in every house, to regulate the circulation of heat. Diaphragm or screw-down valves should be fixed in flow and return pipes of any house or houses that are not likely to require heat during mid-winter, but which will be in connection with the heating apparatus that will be in use throughout the autumn, winter, and spring months. This will permit of the water being drawn from the pipes not being heated, and thus prevent injury from frost.

In placing the pipes in position prior to making the joints, see that the bands in the casting connecting both rims of the individual sockets are in a straight line with each other on the top, the full length of each row of pipes. A line stretched along the top of each row of pipes will make this

easy of attainment, as well as serve to show whether the pipes run in the desired gradual rise with each other the entire length of each row.

TRELLISES FOR PEACH TREES.

Trellises for training peach trees should be fixed longitudinally not less than twelve inches from the glass, at intervals of six inches. A cheap, simple, and efficient trellis may be made as follows:—Fix a piece of one-and-quarter-inch gas tubing, corresponding with the length of rafter up to within one foot of the top of same, to end wall-plate or mullion in front and door-post (where fixed to the end, principal rafter) at twelve inches from the roof glass, with bolts a quarter of an inch thick, tightening these up on the outside by means of nuts, one small plate of iron being placed between each of these and the wood to prevent the nuts cutting into the latter when screwed home, as well as to afford additional strength and durability to the work when completed. This done, place two or three vertical bars (the number being governed by length of rafter) of one inch by a quarter of an inch iron at equal distance from the junction of front with end wall-plates to the door-post, with the irons twisted, cranked about two and a half inches at top, and flattened out a little at each end to admit of their

affixing securely to wall-plate and end rafter with large wood screws, two screws at each end. The quarter-inch edge of irons should rest perpendicularly against the tubings, thereby enabling them to withstand the great strain necessarily incurred in tightening the individual wires, which should consist of No. 14 (galvanised). Having marked with a piece of chalk the position which each of the wires is to occupy, at six inches apart, on the tubings, take the end of each wire once round the tubing, and twist it three or four times round the wire, which, like the several forming the trellis, will be stretched the full length of the house in process of construction. The wires should be cut about twelve inches longer than the house, to enable the different ends to be taken through the central eye and round the wheel in each radisseur, connected to tubing at the other end of the house by a couple of rounds of the same size wire, and then tightened with the key to the desired degree of tightness. This done, insert a series of small screw-eyes at twelve inches apart in each rafter, immediately above each line of wire, the screw-eyes in each successive rafter being placed anglewise to those in the preceding one, so that the weight of crop may be distributed equally over the whole trellis of roof of peach-house, when the latter is connected with the different screw-eyes by means of short lengths of wire of the same gauge with

hooks formed at right angles at each end. These are to be closed in with a pair of pincers when attached to the wires and screw-eyes, thereby completing a most efficient "hinge-trellis," which, in many ways, is preferable to the usual stiffly fixed ones, and it also has cheapness and simplicity of construction to recommend it.

In the case of a span-roof peachery, I need hardly remark that the trellis described above should be fixed under both roofs in the manner indicated, the top wire being fixed immediately under the apex at the proper distance from the roof-glass. The top ends of both sets of tubing should be flattened out a little and then bolted together through the central upright division bar between lintel and ridge, the bolt being secured on the outside by a nut, a quarter-inch by one inch plate, sufficiently long to extend a couple of inches over lintel and end of ridge, having been first placed over the bolt between the nut and woodwork. This plate, being provided with four counter-sunk screw-holes, to admit of its being screwed to the ridge and lintel, will afford sufficient support to the tubing to resist the strain necessarily involved in tightening the top two or three wires. The whole trellis should receive three coats of good white-lead paint as soon as finished, or at least before the peach trees are trained thereto.

VENTILATION.

Upon the manner in which fresh air is admitted to forcing and other glass-houses where plants are being cultivated depends in a great measure the success or otherwise that may be achieved by the cultivator. It must be borne in mind that fresh air should be admitted to the individual glass-houses to prevent the temperature from rising above the desired degree of heat, and not, as is sometimes the case, to lower it—bearing in mind also that a superabundance of fresh air being admitted at one time will not make up for a deficiency of this essential element to good health at another time. On the contrary, the quantity of air given in the early part of the day should be increased and decreased in accordance with the rise and fall of the internal temperature until closing time in the afternoon arrives. Plenty of moisture should be distributed in the forcing-house, in order to promote and maintain a clean, healthy, rapid, yet sturdy growth in the peach trees, the judicious circulation of fresh air during the heat of the day tending to induce a short-jointed, consolidated growth, instead of the long-jointed, sappy growth which invariably results when trees and plants are grown in a close atmosphere surcharged with moisture. In the case of late peaches, it is a good practice

to open the top and front ventilators at about eight o'clock in the evening sufficiently to admit of a gentle circulation of fresh air among the foliage and fruit of the trees during the night, as no plant will flourish in a stagnant atmosphere, —closing the ventilators at six o'clock on the following morning prior to distributing water over the peach border and pathways in addition to syringing the trees thoroughly with clean water. Keep the peachery closed until the thermometer registers from seventy-five to eighty degrees, at which point the top ventilators should be slightly opened, afterwards increasing the amount of air thus given as the temperature continues to rise (opening the front vents a little at the same time) until by noon the ventilators, front and top, may be opened to their full extent. It may also be necessary to open the doors in very hot weather with a view to preventing the temperature in each of the peach-houses rising above ninety degrees. But should the thermometer register even one hundred degrees in these circumstances, it does not matter in the least so long as the trees are moist at the roots and plenty of moisture is distributed in the several houses twice before closing in the afternoon—say at eleven and one o'clock—in order to counteract the drying influence of the sun and to promote a genial atmosphere. From

the time the peach trees have come into flower until they have "set" or formed into fruit a drier and more airy atmosphere should be observed, and from the time the peaches begin to colour—that is, begin to ripen—until they have been gathered, a free circulation of air should be admitted day and night. However, during the period of growth, from the time that the leaves are being developed in houses in which peaches are expected to be ripe at the end of April or early in May until the fruits begin to colour, draughts must be guarded against, as a current of cold air coming in contact with the young leaves and fruit might produce undesirable results in the way of mildew and "curl." During these stages of growth, the front ventilators should be used with great care and judgment when the wind is cold; in fact, in these circumstances, all the fresh air that is required can be admitted through the roof ventilators. If a strip of tiffany be secured inside the peachery to the plates and end mullions immediately in front of the front ventilators, it will admit as much fresh air to the interior of the house as is needful for the welfare of the trees and crop being thus early forced, and at the same time obviate the risk of a current of cold air finding its way to the trees.

SUITABLE COMPOSTS FOR PEACH TREES.

The peach tree is not so particular as to soil as many people assume it to be. That the peach tree, planted in a deep, calcareous, loamy soil, will flourish and produce heavy crops of first-rate peaches (if properly managed) year after year, without being subjected to any preparation in the way of manuring and trenching of the ground prior to planting, I know to be a fact.

It is also quite true that good results in the way of crops can be obtained from peach trees planted in ordinary garden or field soil, enriched with a good dressing of well-decomposed stable-manure in the process of trenching, about two feet deep (more or less according to the natural depth of soil), or digging. Of course it is undesirable that the roots of the trees should be submerged during the late autumn and winter months, or, indeed, at any time, although it would not matter much during the summer months. As a matter of fact, experience goes to show that heretofore much unnecessary expense has been incurred in the making of peach and vine borders and in the preparation of the composts to place therein.

However, where the natural soil is either too light or too heavy in texture to promote and maintain a free, healthy, and fruitful growth in peach

trees, and consequently, the production of heavy crops of fine fruit, borders or holes for the reception of the trees must necessarily be made, the excavated soil being replaced with prepared soils. The most suitable soil for the purpose is the top three inches of a down or pasture which has been grazed by sheep, and which rests on a chalky or limestone subsoil; and whether this be used when dug, or after it has been cut and stacked a few months, does not matter much. This may be used either by itself or with additions of old lime-rubble, wood-ashes, and horse-droppings, at the rate of one cart-load of each to five loads of loam and one ordinary garden barrowful of soot. The turfy loam should be broken up with a spade or digging fork, and the whole mixed well together before being wheeled on to the excavated border or holes which, in the meantime, have been prepared.

MAKING THE BORDERS.

Unless the subsoil or sub-stratum consists of chalk or limestone, it will be advisable to bottom the borders or holes with from four to six inches of concrete or chalk well pounded, so as to prevent the roots of the trees from pushing down into a wet, poor, cold, uncongenial subsoil, and at the same time to confine the roots in the prepared soil.

With regard to the depth and width of a border necessary to the production of heavy crops of first-rate peaches, I satisfied myself many years ago by practical experience of the advantage of a border about ten or twelve feet wide, according to the width of house, and two feet three inches deep immediately inside the front wall, sloping down to a depth of eighteen inches at the northern limits of the border inside a "lean-to" house, having either a south, south-west, or south-east aspect. The last-mentioned aspect is preferable for a house in which peaches are expected to be ripe at the end of April or early in May, inasmuch as the roof glass will be fully exposed to the beneficial influence of the sun's rays during the winter and spring months—that is whenever the sun shines forth during those usually dull months to warm up the forcing-houses and thereby benefit the subjects being forced therein. The depths given above include four or five inches of brickbats or clinkers, broken somewhat fine on top for drainage. Stones with a little gravel put on top to fill in the chinks would answer the purpose equally well. The bottom of the border should slope at the rate of one inch in the foot to the back wall. The drainage should be covered with turfs (where easily obtainable) a couple of inches thick, one foot wide, and from two to three feet long—grassy side down. This will prevent the

soil from getting into and choking the drainage. A border of the dimensions indicated above, well filled with fibry roots, is preferable to a border of twice the depth and width given and but sparsely furnished with roots, as experience teaches us such borders invariably are. What the cultivator should aim at in the initial and every stage of peach-growing is to secure a network of roots in his peach borders and then to feed them well by giving frequent surface-dressings of some approved artificial manure, such, for instance, as Peruvian guano, during the period the trees are swelling their crops, laying on the artificial manure immediately before applying water, so that its virtues may be washed down to the roots as soon as possible. This very desirable state of things is sure to be attained by making the borders as advised above.

In the case of span-roofed peach-houses, the base of the borders on each side of the central pathway should slope at the rate of one inch in the foot to the longitudinal centre of the house, where, if considered necessary, a gutter brick could be embedded in, and level with, the concrete or chalk surface, covered by another placed upside down, and connected with a drain, as a means of carrying away any superfluous water that might otherwise accumulate at the roots of the trees at an

undesirable time of year. The same precautionary measure should be observed in borders of "lean-to" houses where deemed advisable.

The foregoing remarks on the making of peach borders only refer to cases where there is no choice of sites whereon to erect peach-houses but land totally unfit for healthy and satisfactory fruit-tree growth—land where the subsoil is such as to necessitate provision for keeping the roots of the trees in the prepared composts, and the placing of drainage on the bottom of concrete or pounded-chalk base in order to prevent the soil becoming waterlogged at any time.

However, in the case of houses erected on land of ordinary fertility and texture, all that is necessary is to excavate the holes in semicircular form five feet in diameter, and from eighteen to twenty-four inches deep, the bottom being broken up, returning some of the soil, and incorporating short manure therewith before the planting is proceeded with. If the highest known water-line in the immediate neighbourhood of the peach-houses reaches within thirty inches of the surface, it will be advisable to place four or five inches thick of brickbats, clinkers, or stones in the bottom for drainage, covering this with turfs or stable litter to prevent the soil getting into and choking the drainage. Where the natural soil is quite unsuited to the growth of peach trees,

and at the same time it is not convenient to go to the expense of making a peach border on the lines indicated above, I should simply recommend the digging out of holes of the dimensions given, putting in drainage as described, and then filling in with prepared soil of the description above recommended in which to plant the trees, extending the rooting medium of the trees longitudinally during the three following years, by which time the soil in the intervening spaces will have been removed and replaced with the prepared compost, afterwards extending the operations in the opposite direction. These annual extensions of root-space and congenial soil will give renewed vigour and fruitfulness to the trees so treated. As the readers of this manual must first determine the varieties of the peach and nectarine which they intend to grow before they proceed with the planting of the trees, a list of select and sterling varieties is here given for them to choose from.

SELECT VARIETIES OF THE PEACH.

* *First-class certificate from Royal Horticultural Society.*

† *Raised by Mr. Rivers.*

- I. **Alexander*. This earliest of all peaches is of American origin. It is a free grower and good bearer, the fruit being large, full of juice, brisk flavour, and brilliant colour.

In the south and west of England it ripens on a south and south-west wall out of doors about the end of the second week in July.

2. *Waterloo*. Fruit large, fine flavour, and highly coloured: ripening nearly the same time as Alexander.
3. †*Duchess of Cornwall*. Medium-sized free-stone peach which secured an award of merit from the Fruit Committee of the Royal Horticultural Society on June 4, 1901. Skin creamy yellow, with red striped cheek; melting and delicious, with a distinct nectarine flavour. Grows well and bears freely, and is a valuable variety for cold house or forcing (such is the recommendation of the raiser, Mr. Rivers). The fruit ripens nearly as early as the two preceding varieties.
4. **Amsden June*. Fruit medium or large, according to weight of crop, full of flavour, juicy, and grandly coloured: ripening a few days later than the preceding variety.
5. †*Early Rivers*. Large, colour pale straw with delicate pink cheek, flesh melting, or rather dissolving, with a rich racy flavour: ripening about the middle of July.
6. **Hale's Early*. Fine size, melting, and good in every way, thin-skinned. Flowers large: ripening towards the end of July.

7. *Early Grosse Mignonne*. Medium size, melting and full of flavour: ripens early in August. It has globose glands and large flowers. The true variety is rare.
8. †*Crimson Galande*. Large, deep crimson, flesh melting, rich, and finely flavoured; a free-stone peach of the most hardy, fruitful, and vigorous constitution: ripens from the middle to the end of August. Small flowers.
9. †*Dagmar*. Large, very rich flavour, refreshing and juicy, skin downy and of deep crimson, very handsome: ripe early in August. This is a seedling from the Early Albert Peach; glands kidney-shaped, flowers small.
10. *Grosse Mignonne*. Large, thin-skinned, melting, and full of flavour: ripens early in September.
11. *Belle Beauce*. Large, and good in every respect: ripening a week or ten days after *Grosse Mignonne*.
12. *Dymond*. A large, grandly coloured, and richly flavoured peach, of fine constitution, and very fruitful: ripening in September. (I have reason to remember the result of a few remarks that I made upon a somewhat inferior sample of this really fine peach which was submitted to a body of experts towards the end of September a few years ago.)

- ✓ 13. †*Goshawk*. A very large, pale-coloured peach, delicious flavour. A grand mid-season peach.
14. *Royal George*. Large, thin-skinned, highly flavoured fruit: September.
15. *†*Thomas Rivers*. This is a large round free-stone peach, with a bright red cheek: ripening the end of September. Flesh firm, juicy, and full of flavour. Forces well. It was introduced by its raiser, Mr. Rivers, in the autumn of 1898, having received a first-class certificate from the Fruit Committee of the Royal Horticultural Society on the 28th of June the same year.
- ✓ 16. *Noblesse*. Large, fine sweet flavour. An old favourite, and very hardy.
17. *Chancellor*. A fine September peach. Skin downy and of a deep crimson, rich flavour, and very juicy.
18. *Barrington*. Large, melting, and excellent in every way. Succeeds *Royal George* and *Noblesse*.
19. *Stirling Castle*. A medium-sized, well-coloured peach of the *Royal George* type: ripening in September.
20. *Violette Hâtive, or English Galande*. This is a fine peach, being of robust constitution and very fruitful, the fruit being large

and grandly coloured, melting, and full of flavour.

21. †*Prince of Wales*. Large, deep crimson, and good flavour: middle to end of September.
22. †*Princess of Wales*. This is an excellent peach in every respect. The fruit attains to great size under ordinary cultivation, and is very handsome in appearance, being cream-coloured and rosy cheeked, while the quality is rich, melting, and full of juice. Flowers very large (unlike those of the *Prince of Wales*) and beautiful; glands round: middle to end of September.
23. †*Lady Palmerston*. Large, melting, and very good; skin greenish yellow, marbled with crimson; flesh pale yellow. It was raised from a stone of the *Pineapple nectarine*, and partakes of its flavour. This is a very distinct and excellent peach, and ripens towards the end of September. Flowers small; glands small and kidney-shaped.
24. **Thames Bank*. This fine late peach is not so well known as it deserves to be. The fruit is large and the flavour excellent.
25. †*Sea Eagle*. One of the best, if not the very best, of late peaches in cultivation, and is remarkable for its great size, handsome appearance, and brilliant colour; flavour good

✓ *Peregrine*

✓ *Dr Hogg*

✓ *Alexandra Noblesse*

when well grown. It was raised from Early Silver (a large-fruited and well-flavoured variety): end of September.

26. *Walburton Admirable*. Large, melting, and excellent in every way, resembling in its small flowers and glands the Late Admirable. It is a shy bearer, to which fact the large size to which the fruit usually attains may be attributed: the fruit ripens from the end of September into October.
27. *Salway*. This is undoubtedly the latest peach in cultivation—too late, in fact, for ripening with any degree of certainty out-of-doors in the most favoured situation on a wall facing due south or south-east. The fruit attains a fine size, the skin being downy and greenish in colour, and suffused with crimson when ripened under glass with the assistance of fire heat, in which circumstances the flavour is rich and refreshing: October.

SELECTION OF TWELVE VARIETIES OF THE PEACH.

1. Alexander.
2. Hale's Early.
3. Early Grosse Mignonne.
4. Crimson Galande.
5. Dagmar.

6. Dymond.
7. Barrington.
8. Violette Hâtive.
9. Prince of Wales.
10. Princess of Wales.
11. Sea Eagle.
12. Walburton Admirable.

SELECTION OF SIX VARIETIES OF THE PEACH.

1. Alexander.
2. Hale's Early.
3. Early Grosse Mignonne.
4. Dymond.
5. Barrington.
6. Sea Eagle.

SELECT LIST OF NECTARINES.

1. †*Cardinal*. This is the earliest nectarine in cultivation, ripening ten days before Early Rivers and a month earlier than Lord Napier. The tree is of compact and sturdy growth and a free bearer, but is only adapted for growing under glass. The fruit is of medium size, very brilliant colour, exquisite and distinct flavour. It was introduced into commerce in 1898.
2. †**Early Rivers*. Very large. Skin rich crimson next the sun, light yellow marked with red on

the shaded side; flesh green, tender, and juicy, with a rich and decided Stanwick



FIG. 8.—FRUIT AND FLOWERING SHOOT OF EARLY RIVERS NECTARINE.

flavour. The fruit is remarkable for its handsome appearance, as well as for its high quality, and is therefore equally valuable for

market and home supplies. It ripens three weeks before Lord Napier. (See Fig. 8.)

3. †*Lord Napier*. A large pale cream-coloured fruit, with red cheek; flesh melting, and parting from the stone. Flowers large, glands kidney-shaped. The tree is a good grower and free bearer. July-August.
4. †*Improved Downton*. Fruit large with a slight Stanwick flavour. One of the finest of nectarines raised from the Downton nectarine. August.
5. †*Dryden*. This nectarine is alike remarkable for its great size, handsome appearance, and fine quality, the colour being deep red and purple, flesh white; glands kidney shaped, flowers small. August.
6. †*Goldoni*. Fruit of medium size; bright orange yellow, streaked and spotted with crimson when fully exposed to the sun; flesh rich and juicy. August.
7. †*Stanwick Elruge*. Large, melting, and rich, with the Stanwick flavour. A few days earlier than its parent, the Elruge. Early in September.
8. †*Newton*. Fruit of the largest size; round, skin transparent greenish yellow, mottled and blotched with deep red, brilliant on the sunny side; flesh greenish white, pink round the

stone, from which it parts freely; sugary, rich, and delicious, with a strong tinge of the Stanwick flavour. A fine exhibition fruit, ripe in first and second week in September.

9. †*Milton*. Fruit very large, roundish oval in shape, skin bright greenish yellow, but deep red next the sun, almost black; flesh greenish white, but pale red next the stone; very juicy, rich, and finely flavoured; ripens third week in September. It is a grand exhibition fruit.
10. †*Rivers' Orange*. Large, melting, with the rich sugary flavour of its parent, the Pitmaston Orange; it ripens a week or ten days earlier than that variety. September.
- ✓ 11. †*Pineapple*. This is a handsome high-quality nectarine, the fruit being large, nearly oval, pointed; colour deep orange crimson, very rich and juicy. September.
12. †*Humboldt*. This remarkably handsome and high-quality nectarine was raised from a stone of the Pineapple, which it equals in flavour, but excels in point of size. It is a fine exhibition fruit. Season September.
13. *Spenser*. Fruit very large and beautifully coloured, being a deep brown red, mottled on the shady side, very heavy, round; flesh light green, red next the stone, very rich and

well flavoured. A grand exhibition fruit. Ripening the third week in September.

14. †*Darwin*. This is the result of a cross between Rivers' Orange and Stanwick, the former being the seed-bearing parent. It is an orange-coloured fruit of handsome appearance, the flavour being rich and partaking of the Stanwick quality in point of lusciousness. September.
15. †*Victoria*. This is the latest nectarine in cultivation, and requires a warm climate and a favourable situation to ripen it out-of-doors. But it is as a late nectarine for growing in an orchard-house or cool peach-house that it is included in this list. The fruit attains to a large size; roundish oval, flattened at the top; greenish yellow, crimson on the sunny side, very rich and sugary, with the flavour of the Stanwick. It ripens at the end of September.

SELECTION OF SIX VARIETIES OF NECTARINES.

1. Cardinal.
2. Rivers' Early.
3. Lord Napier.
4. Dryden.
5. Pineapple.
6. Humboldt.

The peaches and nectarines enumerated above are given pretty nearly in the order in which the fruit ripens out-of-doors against walls having south, south-east, or south-west aspects.

PEACH LEAVES.

The leaves of some varieties of the peach and nectarine have globular glands (see Fig. 9); others



FIG. 9.—PEACH LEAF WITH GLOBULAR GLANDS.

have kidney-shaped glands (see Fig. 10); while others have no glands, and are—whether owing to

this fact or to some other cause—more liable to the attacks of mildew than the glanded varieties.



FIG. 10.—PEACH LEAF WITH KIDNEY-SHAPED GLANDS.

FREESTONE AND CLINGSTONE PEACHES AND NECTARINES.

Melting peaches and nectarines are those that part freely from the stone (see Fig. 11). Clingstone peaches and nectarines have a firm, rich flesh, which adheres to the stone (see Figs. 12 and 13). The difference in freestone and clingstone fruits arises

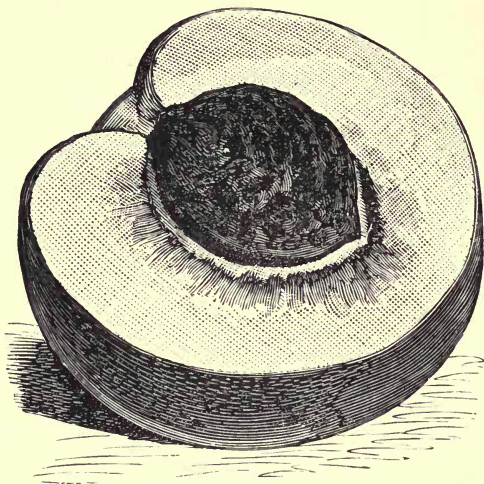


FIG. 11.—FREESTONE PEACH.

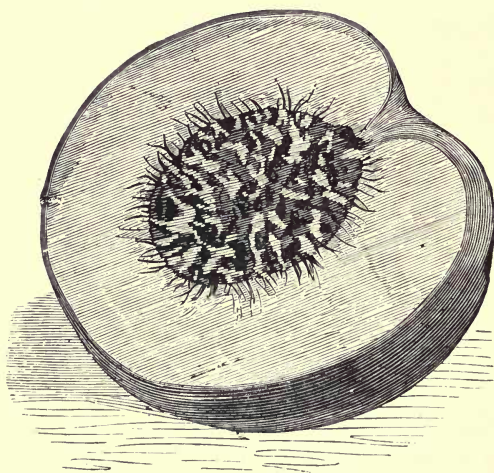


FIG. 12.—HALF CLINGSTONE PEACH.

from the fact that the fibrous cords which connect the pulp with the stones are unaffected in the one case, while in the other they rot at the point of junction with the stone.



FIG. 13.—TRUE CLINGSTONE PEACH.

DEMAND AND SUPPLY OF RIPE FRUIT.

Where a long successional supply of ripe peaches and nectarines is in demand from trees grown entirely under glass—that is, places in which regular and liberal supplies of the above-mentioned fruits are expected to be placed on the dinner-table from the early part of the month of May on to the end of October—if the necessary glass-accommodation and labour are provided, this is by no means difficult to accomplish by a skilful fruit-

grower, or, indeed, by any one of ordinary intelligence, grasp, and application, who carefully follows the cultural details given under the several headings of Culture in this book.

Let us assume that six lean-to houses, 120 feet long each, are provided for yielding the necessary successional supplies of the choice, luscious fruits indicated. In each of these houses I should plant eight trees as follows:—

No. 1. *Peaches*—Two Alexanders.

„ Hale's Early.

One Early Gross Mignonne.

Nectarines—One Cardinal.

„ Early Rivers.

„ Lord Napier.

No. 2. Same as No. 1.

No. 3. *Peaches*—One Early Rivers.

„ Hale's Early.

„ Crimson Galande.*

„ Dagmar.

„ Gross Mignonne.

Nectarines—One Lord Napier.

„ Dryden.

„ Newton.

No. 4. *Peaches*—One Belle Beauce.

Two Dymonds.

One Goshawk.

„ Thomas Rivers.

Nectarines—One Improved Downton.

„ Milton.

„ Pineapple.

No. 5. *Peaches*—One Noblesse.

„ Barrington.

„ Violette Hâtive.

„ Prince of Wales.

„ Princess of Wales.

Nectarines—One Pineapple.

„ Humboldt.

„ Spenser.

No. 6. *Peaches*—Two Sea Eagles.

One Walburton Admirable.

Three Salways.

Nectarines—Two Victorias.

DATES ON WHICH THE HOUSES SHOULD BE
CLOSED FOR FORCING.

No. 1 house should be closed the first week in December, No. 2 the first week in January, No. 3 the first week in February, No. 4 the middle of February, No. 5 the end of February, and by this time the trees will be pushing into flower, no matter how freely the houses may have been ventilated. The same remark applies to the trees in No. 6 house, in which the hot-water pipes will have to be heated in order to thoroughly ripen and put

flavour in the Walburton Admirable and Salway Peaches and the Victoria Nectarine.

In planting with trees a less number of houses than have been referred to above, those mentioned in the selections of twelve and six varieties of the peach and nectarine may be relied upon; or the trees may be easily selected from the general and more extended lists by those responsible for ordering the trees reading and noting the descriptions of the individual varieties enumerated in the book.

Where there is only one house provided in any one place to grow these much-appreciated fruits in, it should be planted as follows:—Peaches: Alexander, Hale's Early, Grosse Mignonne, Sea Eagle, Pineapple, and Humboldt Nectarines. Thus planted, a fairly good succession of fruit will be obtained therefrom during the summer and early autumn months, the trees being planted at fifteen feet apart in each and all the houses of the dimensions given above.

PLANTING THE TREES.

In the case of home-grown trees—that is to say, where young trees have been planted between the permanent trees (space permitting) to grow on for a year or two in readiness for transplanting into new houses or taking the place of old trees in

existing houses, September, or as soon as possible after the crop has been taken, is undoubtedly the best time to transplant peach trees, or any other kind of fruit-tree grown against a wall or trellis, for the matter of that. Before proceeding farther, it may be well to say that the trees should be planted at from twelve to fifteen feet apart, according to the length of rafter used in the construction of each house. Holes of sufficient area and depth are then excavated in the prepared soil, to admit of the home-grown trees (taken up with good balls of earth attached to the roots) being placed comfortably therein at the same depth in the ground as they were before. Care and judgment should be exercised in taking up trees in full leaf, the object being to transplant without subjecting them to any, or at least as little check as possible in the process of transplantation. Therefore, a trench should be opened at from fifteen to thirty inches from the stem, according to the age and size of each tree, working the soil out, around, and from under, meanwhile operating upon the base of the tree with a digging-fork until two or more men are able to lift it bodily on to a strong mat (slipped underneath as soon as the tree can be lifted high enough to admit of accomplishing this), thence on to a hand-barrow. The mat is then secured round the ball of earth and roots and stem of tree, and then conveyed to the hole prepared

for its reception. Into this the tree is lifted, the mat drawn from underneath the ball, any straggling roots shortened back, and damaged ones cut clean off at the point of injury. This done, work the new soil well under and among the roots, arranging the latter with a slight inclination downwards, and making the soil moderately firm about the roots in planting. When this part of the work has been completed, lay on a surface-dressing of rotten or half-rotten stable manure to the thickness of about three inches, extending it over the surface of the loosened soil as a mulch, and then give the whole a good watering to settle the soil about the roots. Tie the branches somewhat loosely to the trellis, and shade them heavily with mats or such-like material from the effects of sunshine for about a week. Then the shading may be discontinued, and the trees syringed with clean water morning, noon, and afternoon in the meantime. Continue this in the afternoon until the leaves begin to change colour in the ordinary way prior to falling, the object being to prevent the leaves falling before the usual time, and thereby ensuring the thorough re-establishment of the roots and trees in their new quarters, ready to respond to nature's call the following spring, summer, and autumn in every way.

In the case of trees obtained from a distance—*i.e.* nurseries, they cannot, as a matter of course,

be taken up and despatched to customers until they have shed their leaves towards the end of November or early in December, according to the character of the weather experienced during the early part of the former month. Weather permitting, the trees should be planted as soon as possible after they have come to hand. Assuming the borders or holes to have been prepared in readiness for planting the trees therein, in the manner recommended under the heading "Making the Borders," the recently deposited admixture or loosened natural soil should be excavated to the depth of five or six inches, with sufficient semi-circular space to allow the roots to spread out over the soil in the bottom of the hole. The bottom should be slightly convex in outline, to cover the trees with six inches thick of the same soil. Give each tree an upward shake in planting so as to let the soil well in among the roots; afterwards make the soil moderately firm with the feet before laying on a surface-dressing of half-rotten stable dung to the thickness of about three inches, making allowance in planting for the loose soil, and for the trees subsiding about three inches. Follow all this with an application of clean water to settle the soil about the roots. The main branches should be tied loosely to the trellis for a few weeks, by which time the soil will have settled down to

the desired level, and, therefore, the branches and individual shoots may be arranged and secured in position without any risk of the tree being "hung up" to the trellis, as would probably happen were the branches and shoots so arranged at the time the trees were planted.

The advantage which home-grown trees, when transplanted in full leaf in the manner indicated above, possess over trees transplanted after the fall of the leaf, must be obvious to all: the former trees being as thoroughly established at the roots and quite as fit to respond to nature's call when subjected to the process of forcing, towards the end of the year or early in January, as trees in the same house which had not been disturbed at the roots the previous year; whereas the trees which have been transplanted after they have shed their foliage make little, if any, root growth before the sap begins to rise the following spring. Hence the gain derived by transplanting trees in full leaf (where home-grown trees are available).

PRUNING AND TRAINING THE TREES—FIRST YEAR.

To begin at the beginning, the leading shoots of young trees obtained from the nurseries should not be cut back to within six or eight inches of their base, as was foolishly done up to within a few years

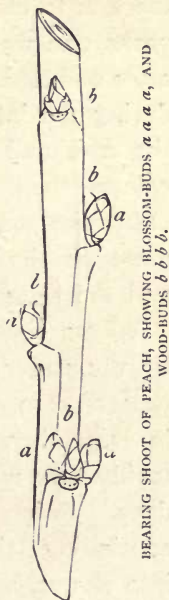
ago, and I am afraid is still done in some gardens. On the contrary, the young shoots should be left their full length, except in so far as topping any that may have run away from their companions in growth, in order to promote a balance of growth in the individual trees. The first spring after planting the young trees, when the sap begins to rise, bend the unpruned shoots towards the ground and secure them to the trellis with raffia grass in that position, the bend starting from the point whence the first of the young shoots are desired to proceed, say three or four inches from the bottom of the individual shoots. The check thus given to the flow of sap causes a sufficient number of wood-buds to push from each shoot to form a good-sized "fan-shaped" tree the first year after planting. Of course, as soon as the buds nearest the base of the individual shoots so treated have pushed into growth, the ties should be cut, the main shoots spread out on the trellis or wall, as the case may be, after the manner of a hand and distended fingers, and secured thereto with raffia, leaving sufficient room in the ties for the due development of the branch without the former cutting into the bark, which would otherwise happen, and train the young shoots indicated above at proper distances, say four inches apart, over the intervening spaces. This is the extension system of training,

pure and simple. This method of training applies equally to trees trained against walls and wooden fences, and secured thereto by means of nails and shreds.

PRUNING AND TRAINING THE TREES—SECOND AND SUBSEQUENT YEARS.

The trees require little, if any, pruning the second year after planting, further than lopping extra long growths and bending down strong central shoots in the manner recommended under the heading of Pruning and Training the Trees—First Year, and for the purpose there described, the object being to furnish the trellis and wall-space allotted to each tree in as short a space of time as possible. When this object has been effected, the trees only require the shoots to be thinned out more or less, according to the manner in which the process of disbudding was performed the previous spring, leaving, of course, as many young growths as are necessary to take the place of the old ones, which should be cut back to the point whence the young shoots proceed, cutting back to one wood-bud at the same time any front shoots that may have been produced during the summer. Strong leading shoots appearing in established trees should be cut out in order to ensure

a proper balance of growth on the tree, that is, an even flow of sap in all the branches, which should be distributed equally over the space prescribed to each tree on the trellis or wall, arranging the shoots at four inches apart, radiating at the same angle from the centre on either side. These distances will admit of one young shoot of the current or following year's growth being trained up the trellis between each pair of branches during the spring and summer months, pinching close back all side and front growths proceeding from these as they appear. In thinning out the young shoots, those retained should be shortened back to the wood-bud next above the top fruit-bud (see Fig. 14); or, in the case of weakly shoots, to three buds located together; the middle one, being a wood-bud, will in due time push into growth.



* FIG. 14.

ATMOSPHERIC MOISTURE.

The distribution of moisture in the peach and other forcing-houses should be regulated in accordance with the gradually increasing rise in the temperature until the maximum degree of heat is

attained to. The higher the temperature maintained in any forcing-house is, the more absolute necessity there is to distribute sufficient water over the floor, paths, and walls of the said house, in order to promote and maintain a genial atmospheric temperature during the interval elapsing between the stoning of the fruit and the stage when the latter begins to colour—the first indication of approaching maturity. Otherwise red spider would probably effect a lodgment on the foliage, to the detriment of the crop and the trees also.

Where ripe peaches and nectarines are required by the end of April, or early in May, it will be necessary to close the early house the first week in December, and to syringe the trees with clean tepid water morning, noon, and afternoon on bright days. Twice a day is sufficient in dull weather—continuing the syringing until the trees come into flower, when a somewhat drier and more airy atmosphere should be observed until the fruit is set. After this the syringing of the trees and the house generally should be resumed and continued, as already stated, up to the time the fruit begins to colour, bearing in mind that the forcing of peach trees during the dull winter and spring months is carried on under difficulty as regards solar heat and light as compared with trees “started” two months later, and consequently they require syringing

overhead less heavily than would be necessary in the case of trees forced under more favourable conditions as regards light and sunshine.

ATMOSPHERIC TEMPERATURE.

The trees should be started with a minimum night temperature of from 40° to 45° , according as the weather is cold or mild, and 50° to 55° in the daytime with fire-heat, rising 10° or 15° higher with sun-heat. These temperatures are meant to be observed in houses closed about the first week in December. Houses closed a month later may be safely given 2° or 3° more of heat all round to start with. When the trees are in flower the temperatures should range from 45° to 50° at night, and from 55° to 60° with fire-heat by day, rising from 70° to 75° with sun-heat, fresh air being admitted to the house meanwhile. When the fruit is set, a rise of 5° in the temperature all round should be observed in the house until the fruit has stoned. From this important and interesting stage of growth until the fruit approaches maturity, the temperature should range from 65° to 70° at night, 70° to 75° by day with fire-heat, 80° to 85° with sun-heat, air being given at 80° , increasing and decreasing the quantity given according to the rise and fall of the thermometer until closing-time

arrives, when the temperature may be run up to 90°, with plenty of moisture being distributed in the house at the same time.

The above-mentioned temperatures are applicable to peach-houses closed any time between the beginning of December and the beginning or middle of February, when trees growing under glass in cool houses will push into flower of their own accord, without having received any assistance whatever in the way of fire-heat.

SETTING THE BLOSSOMS.

In the case of early forced peaches it will be advisable to fertilise the individual expanded flowers by passing some soft substance over them about mid-day when the pollen is dry in order to secure a good "set" of fruit on each peach and nectarine tree. For this purpose the "time-honoured" rabbit's tail tied on the end of a stick answers admirably. The work may be expeditiously and effectually done by simply passing the mounted tail lightly over the expanded flowers each day as they open until a good crop of fruit is set. Trees started later in the season—that is, houses being kept close and moist so as to gently move the trees into growth—open their flowers under more favourable conditions as regards increased

light and sunshine, and in these circumstances a good "set" of fruit may be obtained by syringing the expanded flowers with a fine spray of clean tepid water about noon on bright days. Tapping the trees with the hand or a light stick on dull days to disperse the pollen will also produce the desired effect.

WATERING THE BORDERS.

The knowledge of when to apply water to trees and plants growing in pots and borders of limited and unlimited root-space is only to be acquired by practical experience and a thorough acquaintanceship with the growing requirements of the trees during their various stages of growth, together with a cognition of the manner in which the said borders were formed as regards drainage, natural or otherwise. As soon as the trees have been pruned and arranged in position on the trellis, the woodwork and glass having been previously washed with clean water, and the brickwork with hot liquid lime, the border pricked over and top-dressed with about three inches thick of horse-droppings or well-decayed stable dung, the whole should receive a good watering prior to closing the house in the initial stage of the process of forcing the trees. This watering, as a rule, will suffice, in early forced houses, until the fruit is set—

perhaps until the process of stoning is completed—when the application should be repeated, using tepid water for this and subsequent waterings where available. The trees being in full leaf and swelling their fruits will necessarily require more copious and frequent watering from this stage up to the time the fruit begins to colour—occasional surface-dressings of some approved fertiliser applied immediately before giving clear water at the roots, will greatly assist in the development of large fruit of the best description. Alternate waterings of tepid liquid-manure, diluted when considered to be too strong, will also prove beneficial in the same direction. The borders must receive continued attention in the way of watering after the crop has been taken up to the time they shed their leaves—as a matter of fact, the soil in which the trees are growing should be uniformly moist at all times. If this *sine quâ non* were duly observed, little, if anything, would be heard of peach trees casting their buds when being forced. But in too many cases the trees cease to receive proper attention in the way of being syringed overhead thoroughly morning and afternoon, and keeping the roots well supplied with water when the ripe fruit has been gathered. No matter however pressing the demands on a limited staff of labour may be in other directions, the above-mentioned highly important cultural details should not be

neglected. In applying water to the borders, be careful to give, not surface-waterings, but, on the contrary, sufficient to moisten the whole body of soil and roots.



FIG. 15.—BEARING SHOOT WITH BUDS, *a b c*, REMOVED OR "DISBUDDED."

DISBUDDING.

Those engaged in this simple though important work should, as in other cultural operations, have a

clear idea of the "why and wherefore" before proceeding in the matter, otherwise they will, so to speak, be working in the dark. In the case of peach trees it is absolutely necessary to remove by disbudding a large percentage of the wood-buds as soon as they push into growth—that is, if satisfactory results are desired (see Fig. 15): well-developed and properly ripened wood, arranged on the trellis as indicated under the heading of Pruning and Training, being essentially necessary, in the first instance, to the production of good crops of peaches of the best possible description. Disbudding—that is rubbing off superfluous young growths—must not be done at one time; on the contrary, the operation should be extended over several days, doing a little at a time, in order to prevent the trees experiencing any check in the flow of the sap, a condition which would most probably follow the removal of all the superfluous growths at one time. The buds, when about one-quarter inch in length, should be thinned out to about three or four inches apart on each side of the individual shoots, rubbing off all growths on the upper and lower surfaces of the shoots, those proceeding from the sides of last year's growths being selected at proper distances from one another for bearing fruit the following year. The first of these should be taken from a point as near the base of last year's growths as possible, with the obvious

object of preserving trees furnished from bottom to top with plenty of young bearing wood year after year for a long series of years; the next to it has been left also for the sake of a fruit-bud which is connected with it. The terminal bud is retained for the same reason. By the time the growths have attained a length of about two inches they may be finally disbudded to distances varying according to available trellis space from ten to twenty inches along the individual shoots, the expanded leaves on the young growths retained affording sufficient outlet for the sap to circulate freely and evenly through all the branches. I may here emphasise the remark that heretofore it has been the practice of cultivators—and in other respects good cultivators, too—to annually preserve young growths of the current year's make, regardless of the fact, which they were fully cognisant of, that fifty per cent. of same would have to be cut out at pruning time, thereby needlessly wasting the forces of the individual trees. The sooner this foolish practice is relegated to oblivion the better, cultivators bearing in mind, instead, that by practising a judicious course of disbudding and pinching front growths back to one leaf, very little winter pruning, beyond cutting out an equal number of the previous year's growth to make room for those of the current year's make, is necessary.

THINNING THE CROPS.

Although this work requires to be done with a bold hand, guided by practical experience as to the size which certain varieties of the peach and nectarine attain to under skilful and generous treatment, it must not be done indiscriminately. The vigour and size of each tree must be considered in determining the number of fruits which it shall carry as a crop without in any way impairing its permanent welfare. The thinning out of the fruit is usually done at the same time as the last stage of disbudding is being completed, and, like that operation, it is advisable to extend the process of thinning the crop over a week, finally thinning out the fruit to from nine to twelve inches apart every way on the trellis, retaining, as a matter of course, the most even-sized and best-placed fruits on the upper surface (glass side) of the trees to form the crop. Most growers defer the final thinning until the fruits have completed the process of stoning, being afraid to do so before in case some of the fruit left to constitute the crop would drop off in the procedure of stoning. As a matter of fact, this cautious method of procedure is illogical, and well calculated to bring about the very thing (dropping of the fruit) it was meant to prevent, seeing that the energies of the trees are needlessly and severely taxed in the

stoning of a crop of fruit, fifty per cent. of which the cultivator intends picking off the trees when the process of stoning is completed, unmindful of the fact that his misapplied caution in this direction tends directly to the wasting of the tree's forces, instead of directing them into the proper channels—*i.e.*, the swelling of the crop and the due development of the tree, wood and foliage. In short, there is no fear of strong, free-growing, healthy peach trees dropping their fruit in the process of stoning when cropped as recommended above, and the cultural details are properly attended to in the way of keeping the soil about the roots uniformly moist and the foliage clean. In the case of trees the reverse of those just described, there is all the more reason and necessity for reducing the number of fruit to twelve inches from fruit to fruit every way before the stoning stage is reached. And avoid over-cropping the trees as the greatest evil in fruit culture, always bearing in mind that a dozen well-grown peaches are preferable in every way to three times that number of fruits of like weight in the aggregate. Weakly growing trees should be cropped very lightly, so as to enable them to swell decent-sized fruits and at the same time make stronger wood for yielding fruit the following year.

In thinning the nectarine crops, it must be borne

in mind that the individual fruits of nectarines do not attain to such large dimensions as the peaches do under the same conditions of treatment. The fruits should therefore be left closer together on the trees—say, at from six to nine inches every way, according to the size which the varieties cultivated are known to attain to under ordinary and special cultural treatment. Of course the size, vigour, and general condition of the individual peach and nectarine trees must be considered in determining the number of fruits to be left on each tree for a crop.

As a matter of fact, I have frequently picked prize-winning fruit at the Crystal Palace and leading provincial fruit shows from trees upon which the fruits when ripe were little more than six inches apart. The trees, it is true, were in extra fine condition, the result of cultural treatment detailed in this book. The borders, too, were mulched to the thickness of two or three inches with horse-droppings or well-decayed stable dung, renewed once or twice during the time the fruit was swelling, the virtues of the manure being washed down to the roots in watering the borders. Thereby liquid food is supplied at the roots in addition to the moisture necessary to promote and maintain a vigorous and healthy growth in root and branch, every third watering or so consisting of diluted liquid-manure.

EXPOSING THE FRUITS TO THE SUN.

When the fruits have nearly attained the full size they should be freely exposed to the beneficial influence of light and solar heat, by turning down, shortening back, or removing altogether any leaves that happen to intervene between the fruit and the sun's rays; elevating, by means of short lengths of laths or ordinary plant labels, those fruits which increasing weight and want of branch support cause to drop between and beneath the branches and foliage. The pieces of lath or labels should be placed (under the fruits to be so raised) with the ends resting on the adjoining branches or wires, care being exercised not to force the fruits from their stems in doing so. By following this *modus operandi* the ripening period of the fruit is not only forwarded, but better colour and flavour are thereby imparted to the individual fruits.

SHADING NECTARINES FROM THE SUN.

Nectarines, unlike peaches, are susceptible to injury from strong sunshine when in their second swelling. (The growth of the fruits is apparently at a standstill while stoning is taking place, the energies of the trees being then mainly directed to the formation of a stone in each fruit, and at the

completion of this process the fruits begin to swell again; hence the term "second swelling.") About a pint measure of dust-lime or whiting, passed through a fine meshed sieve, stirred into a vessel containing about two gallons of clean water, and then applied to the glass roof in a fine spray through a garden syringe, will afford ample protection to the young tender-skinned nectarines in interrupting the sun's rays. This shade has an advantage. It can be easily and cheaply made, as well as quickly applied to and removed from the roof glass when needed. In extra hot weather it is sometimes advisable to put a light shading of this kind over peach-houses in which the fruit is ripe, in order to prolong the supply by intercepting and subduing the sun's force. The foregoing remarks apply chiefly to fruit growing in lean-to and three-quarter-span houses having aspects facing south-east, south, or south-west.

GUARDING AGAINST RIPE PEACHES BEING INJURED IN FALLING OFF THE TREES.

In the case of fruit grown for home use, some means must be employed to prevent ripe fruit falling from the trees sustaining injury through coming in contact with any hard substance such as, for instance, the border or trellised pathway. A good

thickness of grass growing in the shade afforded by trees, cut and dried in the sun, and laid over the border and pathway, being light, soft, and somewhat elastic, will answer the purpose admirably. The next best remedy is a net consisting of soft material fixed under the trees, and looped up here and there so as to prevent the fruit falling therein rolling, and thereby sustaining injury by coming in contact with each other. The aroma, colour, and general appearance of the fruit indicate the ripening stage clearly enough.

PACKING PEACHES FOR SENDING AWAY.

In packing peaches and nectarines for sending long or short journeys by rail, whether for private use or marketing, care should be taken not to press the fruit in handling. Otherwise, the results of want of care and judgment in this connection will be visible when the fruit arrives at its destination, and probably a reminder of the fact be sent by the next post to those responsible for the packing and despatch of the fruit.

Boxes four inches deep, fourteen inches wide, and twenty-four inches long (inside measurements) are of suitable sizes for packing large peaches. Boxes three inches deep, twelve inches wide, and eighteen inches long, will answer for sending fruit of moderate size. The best material to pack the fruit in is "wood-

wool." This soft and elastic substance should be placed inside the individual boxes to the thickness of two or three inches. Then (the fruits having been previously wrapped in squares of tissue paper sufficiently large to admit of the ends being twisted together immediately over the crowns of the individual fruits) make an opening in the woodwool with the fingers at the end left-hand side of box sufficiently large to deposit a fruit therein, repeating the operation until the box is filled with fruit, being careful to leave a partition of woodwool between each row of fruit every way in packing in order to ensure the fruit reaching its destination in perfect condition. Put a sprinkling of the woodwool over the fruit thus packed before fastening down the lid of the box. Shallower boxes may be used for packing nectarines in as the fruits are smaller than peaches.

In packing peaches for market, strips of tissue about three inches wide are used instead of square pieces. These, being doubled, are wrapped two or three times round the individual fruits half-way up, and then deposited that depth in the woodwool, in the manner indicated above. A double sheet of tissue is then placed over the packed fruit, followed by a layer of woodwool of the proper thickness to admit of the lid shutting down closely on the box. When peaches and nectarines so packed are offered for sale in the market or shops, it is only necessary

to remove the lids and inner coverings (the work of a minute) to show intending buyers the size and colour of the fruit. Fruit for marketing is generally gathered and sent off a few days before it is really fit for use.

PEACH TREES IN POTS.

Although first-rate peaches and nectarines may be obtained from trees grown in pots, few, if any, practical cultivators would feel disposed to devote a glass-house exclusively to the culture of trees so grown, seeing that more fruit could be obtained from trees planted out in the border and trained to the trellis fixed under the roof glass in the ordinary way, in either a lean-to or span-roofed house of the same dimensions, at less expense as regards initial cost of trees, pots, extra labour, and attention necessarily incurred in securing good results from trees growing in pots. However, where orchard-houses are provided in certain districts in which climatic conditions are unfavourable to the production and ripening of choice pears, plums, cherries, figs, apricots, etc., out of doors, peaches and nectarines in pots in bush and pyramidal form may, in these circumstances, be grown among the above-mentioned kinds of fruit trees, giving the peach and nectarine trees favourable positions as regards light. And in the absence of an orchard-house or peach-house proper, a few peach



FIG 16.—PART SECTION OF PEACH-HOUSE AT SCONE PALACE, PERTH.

trees in pots may be grown and fruited satisfactorily in an ordinary greenhouse by attending to their special requirements in the way of keeping the foliage clean, and the roots well supplied with water during active growth.

Peaches may be profitably grown in pots stood in a row in an encased peach wall without in any way interfering with the welfare of the trees which the glass case was specially erected to protect and forward the ripening of the fruit.

I have in my mind's eye a long, narrow, elliptical-shaped house, which was erected many years ago from a walking-stick and gravel-walk sketch in the gardens at Scone Palace, Perth (see Figs. 16 and 17), against a wall—if my memory is correct—eighteen feet high, and having a due south aspect facing the Pineatum; the width and length were, I think, nine feet and 190 feet respectively. The front wall was above one foot high, including a top course of dressed stone into which the curvilinear iron rafters were leaded, with the top ends secured to the back wall underneath the stone coping. Bent glass was used, as a matter of course, in glazing the roof, the front and top continuous ventilators being worked by machinery from the centre of the house—and a lever used

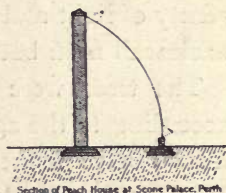


FIG. 17.—GREATLY REDUCED.

to work the front ventilators, while a wheel attached to the bottom of vertical iron bar regulated the top ventilators. The back was, and I have no doubt is still, furnished from base to summit with well-trained trees of the peach and nectarine, while on the ground space between the pathway and front wall stood two rows of trees, or rather bushes, of the same kinds in pots. These bushes, while most favourably placed as regards light, did not in any way interfere with the development of the trees on the wall, being placed sufficiently apart to admit of plenty of light and fresh air reaching the trees on the back wall from bottom to top.

The trees were growing in pots varying in size according to the age and size of the individual trees, from twelve inches to eighteen inches in diameter. When the trees were swelling their crops, some pieces of thin turf were placed round inside the rims of the pots on top, the additional space thus afforded being filled with sheep dung, this application serving a twofold purpose, namely, that of preserving the moisture in the soil about the roots and in contributing largely to the swelling up of the fruits to fine size, by the substance of the manure being washed down to the roots each time water was applied thereat.

In the autumn the trees were turned out of the pots, the balls of soil and roots being pricked round

with a pointed stick, thereby reducing the individual balls more or less, according to circumstances, and then repotted. Those that had been in twelve-inch pots went into fifteen-inch pots, while those that had occupied fifteen-inch pots were shifted into pots eighteen inches in diameter. The plants which had been already in that size pot being reduced sufficiently to enable their returning to same, the roots were shortened back a little before repotting, the pots washed before another use, and a large piece of potsherd placed (hollow side down) over the hole in the bottom of each pot. This is followed with from two to three inches of smaller pieces, the chinks filled in with potsherds passed through a quarter-inch meshed sieve, and over these place a layer of thin turf, grass-side down, to secure perfect drainage. Into these pots the trees were, as indicated above, repotted. A compost consisting of, say, four ordinary garden barrow-loads of good turfy loam, one barrow-load of old lime or plaster rubble, one peck each of some good plant food and charcoal, and an eight-inch potful of new soot, the whole well mixed before being used, forms an admirable rooting medium. This should be rammed in well round the balls, using flat rammers to work the soil into the space between the edge of the pots and the roots, blunt rammers being employed in making the soil firm on top up to within

an inch of the top of the rims of the individual pots. This done, the pots should be stood on a bed of cinders and ashes and watered, syringing the trees overhead two or three times a day in order to freshen up the foliage and to preserve the leaves on the trees until the roots have taken hold of the new soil, and with this object in view the trees should be shaded with a strip of tiffany during sunshine, for a week or ten days, by which time the roots will have pushed into the compost. On the approach of winter the pots should be protected from the effects of frost by a covering of leaves and stable litter. The litter is added to prevent the leaves being disturbed by the force of the wind.

Assuming that the disbudding (see article under this heading, p. 65) and pinching of the shoots retained to form the tree and produce fruit the following year has been judiciously attended to during the previous April and four following months, very little winter pruning of the trees will be necessary, further than the shortening back of a growth here and there by way of getting the individual trees into symmetrical shape before removing them to the glass structure wherein they are to fruit. Trees thus treated present a graceful and natural appearance when laden with ripe fruit, owing to the fact of the young bearing shoots of the previous year's growths having been only shortened back a little

in the process of pruning, the superfluous growths are cut clean away, and in some cases they should be spurred hard back. Thus treated, the trees are not only more graceful in outline, but produce larger and finer all-round fruits, and remain in a more



FIG. 18.—HALF-STANDARD TREE OF THE ALEXANDRA
NOBLESSE PEACH.

vigorous, healthy, and fruitful condition much longer than trees which have been spurred in, like an apple or pear, at pruning time.

That such trees require and should receive copious and frequent applications of liquid-manure at the

roots, in addition to frequent and judicious top-dressings of some approved fertiliser, before applying clean water at the roots, during the whole period of

active growth, but especially during the time they are swelling their fruits, goes without saying. The trees should, as a matter of course, be thoroughly washed overhead with clean water morning and afternoon on bright sunny days, and be given abundance of fresh air between their "washings."



FIG. 19.—A PYRAMID OF THE RIVERS' EARLY YORK PEACH.

Pot trees are usually pyramidal, half-standard, and bush in shape (see Figs. 18, 19, and 20). Crimson Galande, Rivers' Early York, Alexandra Noblesse, Dagmar, Violette Hâtive, and Grosse Mignonne peaches; Early Rivers, Lord Napier, Rivers' Orange, Pineapple, and Dryden nectarines are

all well adapted for pot culture. I may here remark, as bearing on this subject, that the finest specimens of fruiting pot trees of the peach and nectarine which



FIG. 20.—CRIMSON GALANDE PEACH (SIXTEEN YEARS OLD).

the writer had hitherto seen were staged by Messrs. Thomas Rivers & Son at the famous Shrewsbury (Shropshire Horticultural Society's) show in August 1891. The exhibit included, in addition to peaches and nectarines, black and white grapes, pears, plums, cherries, and apples, one and all bearing evidence of high cultural skill having been bestowed upon them during the six previous months, between the hours of sunrise and sunset, in the orchard-house at Sawbridgeworth, the birthplace of so many grand varieties of the peach, nectarine, plum, etc. The peach trees in the above-mentioned exhibit varied in height from six to ten feet, and were pyramidal in shape, the top two or two and a half feet of growth constituting the pyramidal forms consisting of the current year's growth.

Zinc bands, about three inches broad, with three label-like projections on the bottom edge for inserting in the soil close to the rims of the individual pots, may be easily and quickly made by any tinsmith to fit the size pots indicated above. These are easily attached to the pots, and afford ample room for liberal top-dressings of sheep-manure or horse-droppings being made from time to time when the trees are swelling their crops.

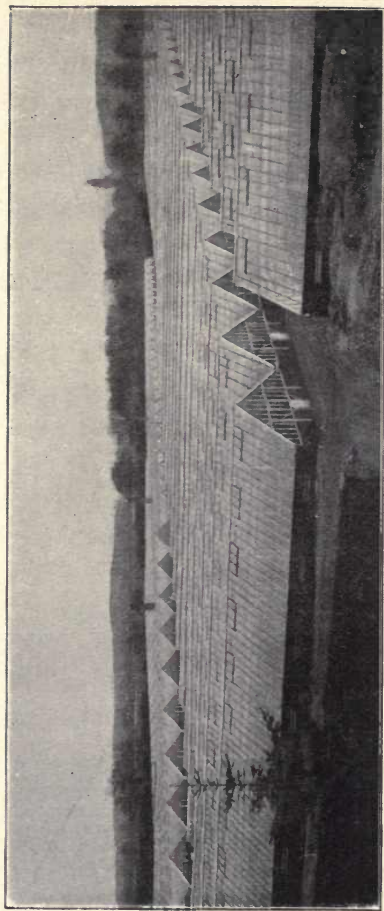


FIG. 21.—BLOCK OF SPAN-ROOFED PEACH-HOUSES, AS ERECTED FOR MARKET PURPOSES BY
MR. W. DUNCAN TUCKER.

PEACH GROWING FOR MARKET.

In starting to grow peaches and nectarines for market, it will be a great advantage if the grower can erect about four or more blocks of span-roofed houses, each block consisting of, say, from three to six or more houses (see Fig. 21), each block only requiring two side and two end continuous walls $2\frac{1}{2}$ feet high, the side walls consisting of $4\frac{1}{2}$ -inch brickwork with 9-inch piers built therein at intervals of 8 feet, the piers being built flush with the walls on the inside in order to sustain lateral pressure, the end walls consisting of 9-inch work. Houses from 18 to 24 feet wide, and any length between 50 and 200 feet, are suitable for the production of peaches for any purpose. Nine-inch piers should take the place of the continuous division walls for supporting the valley gutter-plate, to which the rafters of each pair of spans are nailed opposite each other at the proper distances apart, these being secured to the ridge at the same time. Of course, the piers are on a level, running or otherwise, with the side and end walls.

The gutter-plates should consist of pitch-pine 12 inches wide and 2 inches thick; the individual plates should fit together on a pier, and not a short distance therefrom, in order to save cutting off a piece. All the other wood, wall-plates, rafters, etc.,

required being of the dimensions given under the heading of Construction of Peach-houses (p. 8), they need not therefore be repeated here.

In planting the above-mentioned blocks of houses, the question naturally arises as to the best varieties of the peach and nectarine for yielding a good succession of ripe fruit from the end of April onwards, not only to meet the demand for these delicious fruits during the London season, but also in large provincial cities and towns at the same time and for several weeks after the London season is practically over—that is selecting varieties, ripe fruit of which can be put on the market as early in the season as possible at a minimum cost of production in the shape of a coal or coke bill. Well, having duly considered this point, let us assume that each block consists of four houses; we should plant—

- No. 1 house with Alexander, Duchess of Cornwall, and Waterloo Peaches, and Cardinal Nectarine.
- No. 2 house with Alexander, Early Rivers, Waterloo, and June Amsden Peaches, and Early Rivers Nectarine.
- No. 3 house with Hale's Early, Early Grosse Mignonne, and Goshawk Peaches; Lord Napier, Dryden, and Improved Downton Nectarines.

No. 4 house with Dagmar, Crimson Galande, Dymond, and Royal George Peaches; and Dryden, Pineapple, and Newton Nectarines.

Thus planted, block No. 1 would give a succession of ripe fruit extending over three weeks. Blocks Nos. 2 and 3 may be similarly planted, but block No. 4 should be planted as follows:—

No. 1 house with Grosse Mignonne, Dymond, and Prince of Wales Peaches; Stanwick Elruge and Pineapple Nectarines.

No. 2 house with Noblesse, Violette Hâtive, and Lady Palmerston Peaches; Milton and Humboldt Nectarines.

No. 3 house with Barrington and Princess of Wales Peaches; Spenser and Darwin Nectarines.

No. 4 house with Sea Eagle (mostly), Walburton Admirable, and one or two trees of Salway Peaches and Victoria Nectarines.

No. 1 block of houses should be closed for forcing the first week in December, each of the other blocks being closed at intervals of about three weeks respectively; the fourth block would therefore be closed the middle of February.

The houses in block No. 1 should be 18 feet wide, these being provided with four rows of 4-inch hot-water piping each, the flows resting on suspen-

sion hooks attached to the wall or gutter-plate close to each row of piers, and returning on either side the central pathway into the main return fixed alongside of the main flow in channel running across the lower end of each separate block of houses. The houses in blocks Nos. 2, 3, and 4 may with advantage be 24 feet wide, the houses in blocks Nos. 2 and 3 being each provided with four rows of 4-inch hot-water pipes. The pipes in block No. 4 need not as a rule be heated, as the succession of ripe fruit can be secured in most seasons from the trees growing in the houses constituting this block unaided by artificial heat; still, some seasons it may be necessary to utilise the hot-water pipes to ripen the fruits of Salway satisfactorily. For information regarding the fixing of the heating apparatus and making the joints, see article under heading of Heating Peach-houses. The preparation of the border (where preparation may be considered necessary), planting and training of the trees, disbudding, and all other necessary cultural details being the same as already described in this work under separate headings, they need not be further referred to here.

MARKETING THE FRUIT.

In marketing the fruit (see note under the heading of Packing Fruit for Market) it is a good plan

to send consignments of the same quality fruit to two or three of the most reliable fruit salesmen in the market on the same dates, afterwards sending most fruit, as a matter of course, to those returning the highest prices. The salesmen supply customers with boxes bearing their respective names and addresses, also address and invoice labels, for sending the fruit to market.

PROVIDING UNDERGROUND RAIN-WATER TANKS.

One thing that all skilful horticulturists are agreed on is the great superiority of rain water to well water for application to the roots and overhead of cultivated trees and plants, especially those grown under glass. Therefore, underground tanks should be made in all glasshouses for the reception of rain falling on the roof-glass, and conveyed thither by inlet pipes connected with the overhead-glass shooting or valley gutter, as the case may be.

In the case of lean-to houses or three-quarter spans, the soft-water tank should be excavated under the pathway at the back. The sides and ends of the individual tanks should be cut evenly down and on the batter, so that the $4\frac{1}{2}$ -inch brick wall may be built up close against solid earth from bottom to top. A "dip-hole," about 2 feet square and 20 inches deep below the bottom of the tank

(which should slope gently in the direction of the said dip-hole), should be provided in making the tanks. This will allow a full can or bucket of water to be extracted from the tank as long as the bottom is covered with the crystal fluid. A tank 21 feet long, $4\frac{1}{2}$ feet deep, with an average width of $3\frac{1}{2}$ feet (inside measurements), will hold about 2000 gallons of rain water. A $4\frac{1}{2}$ -inch tie-wall should be built across the middle of the tank, leaving a space of $4\frac{1}{2}$ inches from the floor-line in the centre of division wall, to enable the water to rise in both divisions at the same time. The top course of brickwork should be built in cement, and the whole surface of work should be afterwards faced with compost, consisting one part of cement and three of sharp sand. In excavating for a tank of the dimensions given above when built, 9 inches more should be added to the length and width, and $4\frac{1}{2}$ inches to the depth. A few short lengths of oak, 4 inches by 3 inches, placed across the tank at intervals of about 3 feet, will afford ample support for the trellis pathway to rest on.

Each block of span-roofed houses should have two tanks of the description indicated run right across the several houses constituting the block—one at the bottom and one half-way up the length,—a short length of lead pipe, say, six inches long, two or three inches in diameter, with a flange on

top, being inserted in the gutter-valley immediately over the respective tanks, to convey the rain water falling on the glass-roofs therein. It would be money well spent to make a pond or other kind of sunken reservoir, to take the overflow water from these tanks during the autumn, winter, and early spring months, thereby providing a good supply to fall back on in time of need—*i.e.*, when a spell of dry weather has set in. Still better, if a galvanised iron tank, capable of holding 1000 gallons of water, is elevated, on a substantial frame-work, to the level of the ridge of houses at the highest end, and the water pumped up into it by a small gas or oil engine, or windmill, connecting the elevated cistern with the several houses by means of gas tubing, standpipes, and a length of hose, thus securing a boon that cannot be too highly valued in forcing-houses—namely, a supply of sun-warmed rain water laid on in readiness for use through the hose when required.

PEACH GROWING ON THE OPEN WALLS.

During an experience extending over a great number of years, in large gardens and nurseries situated in different parts of England, Scotland, and Ireland, I have fully convinced myself that peaches and nectarines can be successfully grown in most, if not in every county and parish throughout the length and breadth of the land constituting the United

Kingdom, seeing that in every county and parish—even in the most northern counties—sheltered and sunny situations are to be found, where, we may reasonably assume, are also to be found walls or fences having a south, south-east, south-west, or west aspect. Peaches will also succeed on walls having a due east aspect in the southern and western counties of England, Scotland, Ireland, and Wales.

The trees should be planted fifteen feet apart, against the wall or fence. Mark with a piece of chalk or charcoal the central position of each tree on the wall or fence at the distance indicated, making a similar mark on both sides of the central mark at $2\frac{1}{2}$ feet; put a short stick in the ground at the same distance from the central mark on wall or fence, and then strike a curvilinear line touching all three points, thus giving a semicircular sweep of five feet. Excavate this prescribed space to the depth of $2\frac{1}{2}$ feet, putting the good soil (top spit) on one side and the bad on the other for removal. Put six inches deep of brickbats or clinkers in the bottom of each hole, breaking these fairly fine on the top for drainage; cover this with thin turfs, grass side down, to prevent the soil getting into, and thereby choking, the drainage. Assuming the natural soil to be unsuitable to the requirements of the peach as a rooting and sustaining medium, the best turfy loam obtainable should be used, and

should old lime-rubble be easily obtained, add one load of it to four loads of the loam, turning this over once or twice to get it thoroughly mixed before depositing it in the holes. Into the holes thus prepared plant the trees in the manner described under the heading of Planting the Trees, finishing off with a surface-dressing of short manure to the thickness of three or four inches, and give the whole a watering to settle the soil about the roots; the pruning and training of the trees during the first and subsequent years being the same as advised under the respective headings, while the disbudding, thinning of the fruit, etc., should be done as recommended under the several headings in the cultivation of the fruit under glass. Where the walls and fences are not wired, the fastening of the trees and the young branches must necessarily be secured in position by means of nails and shreds, but take care to leave sufficient room in the loops for the due development of the shoots.

Wired walls are preferable for the training-to of the peach and nectarine: the work of training can be done quicker, the fruit is not so likely to be disfigured by insect pests, which, where nails and shreds are used, attack the fruits on the sides next and close to the wall or fence. Moreover, there is no defacing of the walls thus wired, as is the case where nails and shreds are employed, the branches being secured

to the wires with matting, leaving enough of room in the individual ties for the proper development of the branches. Young trees may be grown on for two or three years between the permanent trees for transplanting elsewhere when space is no longer available between the latter, galvanised driving eyes, $2\frac{1}{2}$ inches long, driven $1\frac{1}{2}$ inch into every other course of bricks at intervals of 3 feet, commencing about 15 inches from the ground, the eyes in each succeeding row being arranged anglewise to those in the preceding row in order to give additional and equal strength to every wire constituting the trellis.

RETARDING THE FLOWERING PERIOD.

The first week in January all the young branches should have the ties securing them to the wires cut, and be tied loosely together in small bundles and suspended from the wires in such a way as not to be injuriously affected by high winds. In this position they should be allowed to remain until the flower buds show signs of opening, when the shoots must be liberated, and any necessary pruning may be attended to and the trees re-arranged on the trellis or wall, as the case may be. In the case of unwired walls or fences, the nails should be drawn and saved, together with any shreds worth saving, for future use, and the shoots tied together as indicated above, and for the purpose there stated, the

free current of air passing between the sun-warmed wall and the trees serving to retard flowering time.

PROTECTING THE FLOWERS FROM FROST.

Bearing in mind the commercial value of a good crop of peaches such as may annually be obtained from trees growing against walls and fences out-of-doors by the exercise of timely forethought and judicious management, the incurring of small expenses in the way of labour and initial cost of protecting material need not, therefore, be viewed in any other light than that of a safe and paying investment, seeing that the adoption of the protecting material and mode of using it described below renders the securing of a good crop of peaches every year pretty well certain. That which I here recommend I employed for twenty-five years in Langford Castle Gardens, near Salisbury, and never once failed to obtain a good "set" of fruit, and during that period I have on several occasions described and recommended the *modus operandi* in the gardening press for the benefit of peach-growing readers.

In the first week in February the time may be said to be at hand when peach and nectarine blossoms will require to be protected from frosts, and protective material should be provided ready

for use a week or two hence. The best temporary protecting material that I am acquainted with is a kind of perforated cotton canvas known in the horticultural trade as No. 5 hexagon shading. Two widths of this, consisting of fifty-four inches each, being joined together will afford ample protection to trees in flower trained against walls from nine to twelve feet high. This should be bound top and bottom with broad tape, stretching lengths of the same crosswise at intervals of about ten feet the entire length of the cloths. On to these fasten about nine rings, through which and the pulleys to pass the sash-lines for the purpose of raising and lowering the cloths when necessary. I have used this kind of material, as already stated, for twenty-five years for protecting not only peaches but also apricots and greengage plums with satisfactory results, the fruits having set so thickly on the trees as to render severe thinning necessary. The blinds, as already stated, are raised and lowered by means of sash-lines and pulleys, fixed in the following manner:—A series of light poles, varying from three to four inches in diameter at the bottom to two inches at the top, the latter having a slice one inch thick, and three inches deep, cut off one side to screw strips of board of the same dimensions to, on which to secure the cloth and screw pulleys and hooks for raising and looping up the blinds by means of

short lengths of stout string provided for the purpose. These poles are let into the ground a few inches, about five feet apart and eighteen inches out from the wall, the tops (round side) being secured in Y-shaped holdfasts driven into the wall immediately below the coping, and against the face of which the several poles rest, and screwed thereon are shouldered straps of iron one inch wide, and a quarter of an inch thick, rounded on one side, with a bolt and nut on top, and on these boards, about fourteen inches wide, and provided with half-inch circular holes, are fastened by means of oblong washers and nuts, the former being placed between the latter and the wood. Hooks are driven into each pole nine feet from the top, to secure the blinds when let down every evening if frost is apprehended. This is very necessary, as wind rising at night would otherwise do much damage to trees and blinds. The poles, boards, and cloths referred to above will last for several years if stored in a dry place when not in use. They are easily put up and easily taken down. Wide coping boards alone, used in the manner indicated, make a fairly good protection to expanded fruit blossoms, as it is the downward direction of frost that does the mischief. Fish-nets, doubled or trebled in thickness, if hung up in front of the trees, may be used with effect where nothing better is available.

Glass copings (see Fig. 22) are to be recommended for protecting apricot blossoms, but when used for the same purpose in the case of peach trees the foliage is sure to become badly infested with red spider if not kept well syringed with clean water. If glass is to be employed with a view to securing a good set of fruit, I should certainly prefer one of the Improved Wall Fruit Protectors or Peach Cases (see Fig. 23). As will be seen, the front lights are made to slide past each other, thus enabling an abundance of fresh air to be admitted to the trees when in flower, and again when the fruit is nearing the ripening stage, and at the same time allowing of the trees being properly syringed and attended to on both sides. The case, erected against a wall 9 feet high, is 6 feet wide at the ground-line, the front lights are 7 feet long, and the top ones 4 feet 3 inches in length. Thus it will be seen ground-space is available in front for a row of peach trees in pots.

Viewed from a commercial point—as most things have to be viewed nowadays—the crops which

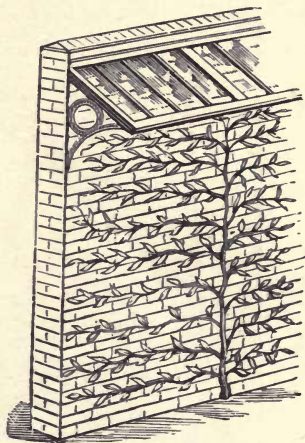


FIG. 22.—GLASS COPING.

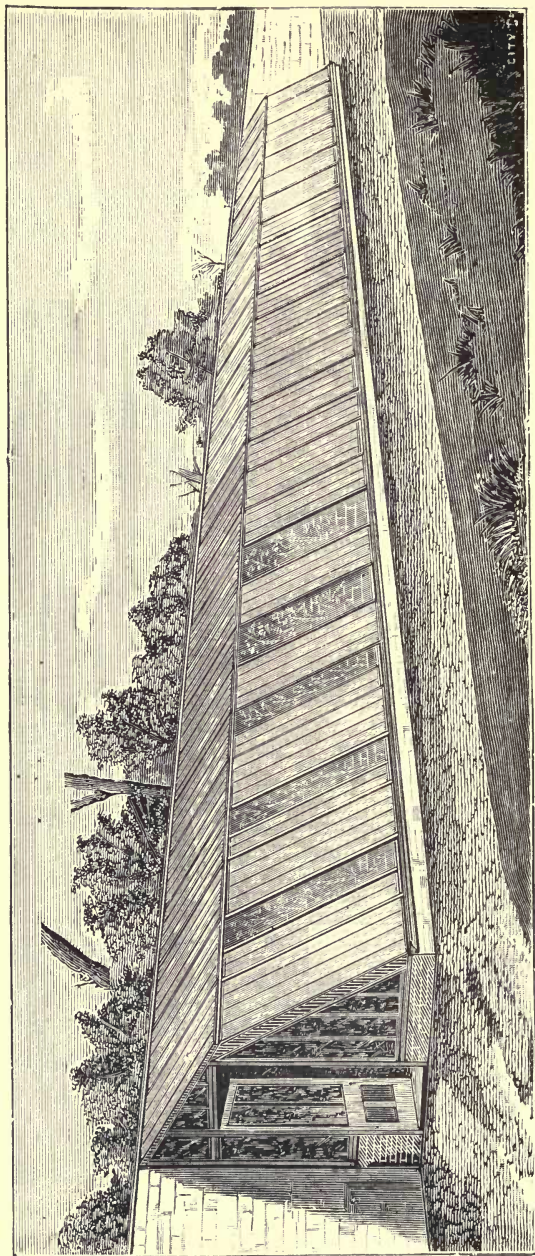


FIG. 23.—THE IMPROVED WALL FRUIT PROTECTOR.

would undoubtedly result from trees grown in such a structure would soon repay for the outlay incurred in the erection of the same.

WATERING WALL TREES AT THE ROOTS.

As the result of experience gained in the lifting and transplanting of wall trees, not only of the peach, but also of the apricot, plum, cherry, and pear, I am fully convinced that the soil about the roots of trees planted at the foot of walls having various aspects, but more especially that in which trees are growing against walls having south and west aspects, is invariably too dry, if not uniformly dry, for healthy root and branch growth. This I have found to be the case even in a summer and autumn that might fairly be described as wet. This however, is not to be wondered at, seeing that, in the very nature of things, the bricks and mortar of which the footings of the walls consist are of a most moisture-absorbing nature. In addition to this, both the border and the alley immediately over the roots of the trees are sloping from the wall and the surface hard—circumstances which allow any rain falling thereon to run off, and rain coming direct from the south and west run off in the same way. Therefore in these circumstances wall trees, especially peach trees, should receive frequent and copious waterings at the roots during

active growth. Indeed, I have frequently had the liquid-manure tanks emptied on the peach borders during the late autumn, winter, and spring months, and with beneficial results, notwithstanding the fact of the trees being leafless at the time.

In addition to these waterings, or rather preparatory to the application of water at the roots at regular intervals during the spring and summer months, the surface of the ground extending about three and a half feet from the stems of the individual trees was pricked over with a digging-fork to the depth of three or four inches, followed with a surface-dressing of short manure to the thickness of about three inches and a good watering. This was done as soon as the protecting apparatus was erected. The protecting cloths, etc., should be removed when quite dry, as soon as the young fruit has attained to the size of large peas, and should aphides have effected a lodgment on the young leaves by that time, means should be taken forthwith to dislodge them, bag and baggage. Disbudding and thinning of the fruit, as advised under those headings.

THE REMEDY FOR APHIDES ON TREES OUT-OF-DOORS.

One quart of tobacco juice to four gallons of water. This being well mixed, by drawing it into the syringe and then discharging the contents into the same

vessel, should be syringed over the affected trees in the afternoon, after the sun has left for the day. Probably this one application will, in addition to destroying the aphids then on the trees, render the foliage distasteful to future attacks during the remainder of the season.

RED SPIDER ON TREES OUT-OF-DOORS.

In order to maintain the trees in a clean, healthy condition, the soil about the roots must be kept uniformly moist, and the foliage well syringed with clean water every bright sunshiny afternoon, when the sun has gone off the trees, throughout the summer and early autumn. There is no fear of trees thus treated "casting" their fruit-buds the following year. This remark applies more especially to the trees growing under glass.

BUSH PEACH AND NECTARINE TREES IN THE OPEN.

The day is not far distant when the growing of bush and half-standard trees of the peach and nectarine as a commercial enterprise will be practised on a more or less extensive scale in the United Kingdom with satisfactory results. It is only reasonable to suppose that any system of



FIG. 24 — EARLY RIVERS NECTARINE IN THE OPEN AT LANGLEY.

culture which can be carried out successfully in a small way can be done even more successfully on a large scale. The ground for this prediction must have been apparent to fruit-growers who, during the autumns of 1900 and 1901, have had the pleasure of seeing the fruiting bushes and half-standards of Early Rivers nectarine (see Fig. 24) in Mr. Turner's tree nursery at Langley (about one mile from his Royal nurseries at Slough), and also at Messrs. James Veitch & Sons' Langley nursery, both nurseries extending a considerable distance alongside the main line of the Great Western Railway Co., and to the patrons of which the sight of the charming floral picture in Messrs. Veitch's seed grounds, consisting, as it does, of distinct and telling colours, and a variety of soft and delicate tints, ranging between pure white and crimson, is very refreshing and welcome in emerging from a landscape whose chief features are brickfields and their products. In Messrs. Veitch's Langley nursery the *Précoce de Croncels* ripens a few days before Early Rivers. The loamy soil at Langley is fairly rich, deep, and adhesive—characteristics eminently favourable to the growing of fruit trees, especially under such semi-tropical (I almost said tropical) weather as we have experienced the last few years (from 1897 to 1901). The solar heat being so unusually powerful during the summer and autumn months of these

years, peaches and nectarines swelled out and ripened on bush, pyramidal, and half-standard trees growing in the open in localities with far less favourable conditions as regards soil and situation than those under which such good results have been obtained at Mr. Turner's nursery. There the fruits of Early Rivers were large and highly coloured.

There are plenty of places in nearly every parish in Great Britain and Ireland in which bush, pyramidal, and half-standard trained trees of the peach and nectarine would grow and ripen their crops of luscious fruits freely and thoroughly in the open. The most favourable conditions under which to grow the above-mentioned trees in the best possible manner as regards soil and situation are as follow: Good, loamy soil of fair depth, sloping well to the south or west, and sheltered somewhat from north-west to east by a belt of trees or high hedges. Trees planted in good-sized holes made on the sunny slopes of hills such as are to be found in the neighbourhoods of our valleys fertile and otherwise throughout the country, and the summits of which would afford all necessary shelter to the trees. Where the natural soil is not considered good enough, add some prepared mould thereto in sufficient quantity to render it suitable to a satisfactory root-and-branch growth being made and

sustained therein. In planting trees in such positions a series of terraces, about ten feet wide each, could be easily and cheaply made by removing the top spit of soil from the high side of each successive width and placing it on the low side of the preceding one, and so on until the necessary number of terraces are formed in due order up the hillside. Make the holes ten feet apart along the centre of each terrace thus formed. The raised side of one and all should be one or two inches above the level (crosswise), this being done by putting a row of turf, one foot wide, grass side up, so as to form a raised edge the entire length of the individual terraces. This will retain any rain that may fall on each platform for the benefit of the trees. The trees in each succeeding terrace should be planted anglewise to those in the preceding one. This will give them more room to develop than they would have if planted opposite each other.

By way of showing that a good peach or nectarine tree may be established within a few years from the time of planting, I may mention that the figure of Early Rivers (taken from a photograph) represents a tree eight years old from the graft, the result of following a judicious course of disbudding and pinching of the young growths—see treatment recommended under the heading of Peach Trees in Pots (p. 75).

VARIETIES TO BE GROWN IN THE OPEN.

The best varieties to grow in the manner recommended above are—Peaches: Alexander, Waterloo, Amsden June, and Hale's Early; Nectarines: Précoce de Croncels, Early Rivers, and Lord Napier. The varieties of the respective kinds ripen in the order in which their names are given, all being extra early varieties, and therefore are sure to ripen satisfactorily in the open during ordinary summer weather; but the more tropical-like the summer may be the earlier in the season will ripe fruit be gathered, as a matter of course. Top-dressings of stable or artificial manure pointed into the soil around the trees when rain is likely to fall will help the fruit to swell to large dimensions.

DISEASES AND INSECTS.

Peach trees treated as recommended in this work are not likely to suffer from disease or the attacks of insect pests—always providing that healthy, kindly growing trees were obtained from a reliable source to start with. However, it is as well to briefly refer to the diseases with which the trees sometimes become affected, as well as the insects which, under certain conditions of treatment, prey upon both wood and leaf, and to indicate remedies,

as under the most skilful management some trees become diseased.

Gumming sometimes takes place in previously healthy trees. An exuberant flow of sap will sometimes result in gumming. Severe pruning of a vigorous-growing tree would, I should say, also cause gumming in due time. On the other hand, a healthy, vigorous-growing tree, which has been properly managed during active growth in the way of disbudding and stopping of extra strong growths, if not by removing them altogether, so as to direct the flow of sap into the weaker growths, thereby causing an equal distribution among all the branches, will not be affected by gumming. An indiscriminate use of animal manure in the soil when planting would tend to gumming in time. Where gumming does take place, the best thing to apply in the shape of a remedy is to wash off the gum with a brush and clean water, and afterwards dust over the affected portion or portions with freshly slaked lime, repeating the operation if necessary.

Mildew ("Ordium Tuckeri") is destructive if not taken in hand as soon as it appears. The affected leaves should be dusted over while damp with flowers of sulphur. Trees growing in cool houses are liable to the attacks of mildew in dull weather, the young foliage being the first to develop the fungus, which appears in the shape of a white

powder in small spots, and which quickly spread if not checked. Either extreme will produce mildew—dryness at the roots or a low, over-humid atmospheric temperature.

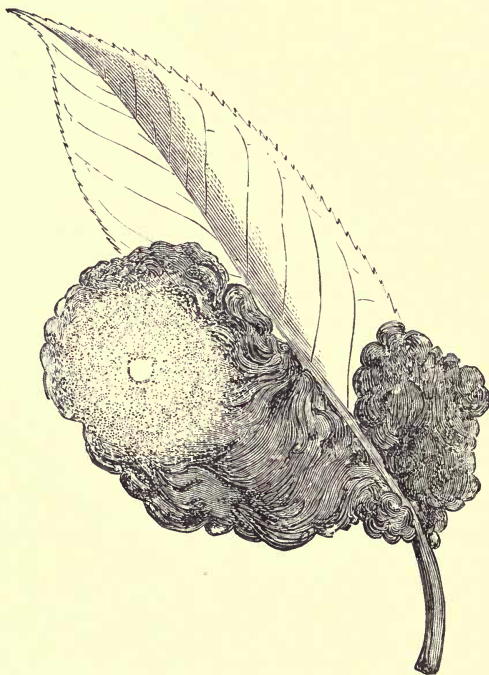
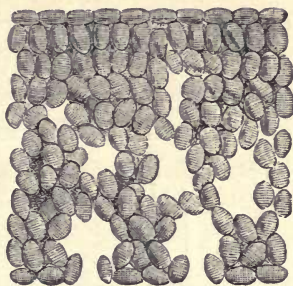


FIG. 25.—LEAF OF PEACH ATTACKED BY "BLISTER"
FUNGUS (*ASCOMYCES DEFORMANS*).

Blistered leaves are caused by a spell of cold following a short period of warm, genial weather (see Figs. 25, 26, 27, and 28). The growth of the midrib being checked, the sap is thereby obstructed in its circula-

tion, and consequently becomes swollen into inert masses. The only remedy that I know of is to remove the affected leaves forthwith, if not too numerous, in which case only the worst leaves should be pinched off, removing the remainder as soon as a favourable change in the weather induces fresh, healthy foliage to push forth.



X.200.

FIG. 26.—TRANSVERSE SLICE OF A HEALTHY PEACH LEAF.

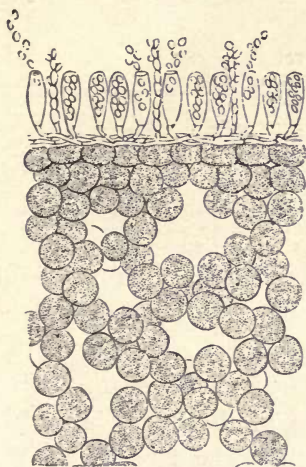


FIG. 27. — TRANSVERSE SLICE OF PEACH LEAF AFFECTED WITH ASCOMYCES DEFORMANS, SHOWING MORBIDLY ENLARGED CELLS. AT TOP OF FIGURE ARE REPRESENTED THE ASCI CONTAINING THE SPORES.

Aphides is a troublesome and (if not eradicated at once) a destructive insect. When this pest attacks trees growing under glass, fumigation by tobacco paper, or XL ALL Vaporising Compound, in the evening will rid the trees of the depredators, syringing them the following morning with clean water. When the fly, green or black, effects a lodgment on trees growing against walls or in the

open they should be syringed, as stated in connection with the treatment of wall trees, with a solution of tobacco juice and water used in the proportion of one quart of the former to four gallons of the latter, this being applied to the trees after the sun has gone off them in the afternoon.

Red Spider ("Acarus telarius"), once it has effected a lodgment on young foliage, is a most stubborn foe to conquer. Applying liquid

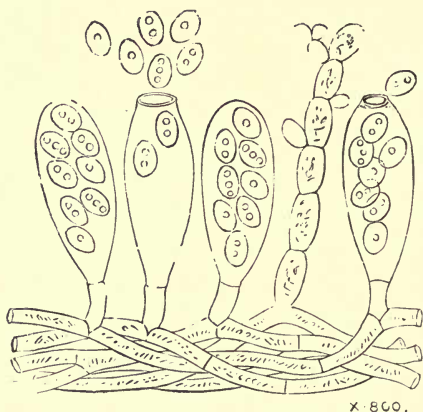


FIG. 28.—ASCI AND SPORIDIA OF ASCOMYCES DEFORMANS, ENLARGED TO 800 DIAMETERS TO SHOW THE ONE, TWO, OR THREE NUCLEI WITH WHICH EACH SPORE IS FURNISHED.

sulphur, or rather lime-wash into which a liberal quantity of flowers of sulphur has been stirred, to highly heated hot-water pipes in the evening, is the most radical as well as effectual way of dealing with the pest. The temperature of the house in which the affected trees are should be kept up to 82° for about three hours, or as near that degree as the highly heated pipes will enable the temperature to reach; the atmosphere, being charged with the

sulphur fumes, will produce the desired effect. At the expiration of the three hours the fire should be banked up, and a little fresh air admitted to the house. Should any living spiders be found on the foliage the following morning, the pipes should be heated as before at night. I may say that I should only have recourse to sulphuring the pipes when a well-directed application of the syringe and clean water failed to dislodge the spider.

Brown Scale ("Lecanium Hibernaculorum") and *Thrips* ("Thrips minutissima") sometimes effect a lodgment on peach trees, and if not dealt with pretty promptly during the winter pruning, they will assuredly make their presence felt. The trees thus affected should be painted with a mixture consisting of a quarter of a pound of soft soap dissolved in a gallon of hot water and a port wine glassful of petroleum, to which add a handful of flowers of sulphur and a like quantity of new soot, and sufficient clay to give the whole the consistency of thick paint. This being stirred occasionally, should be applied carefully and thoroughly to the affected trees before they are re-arranged on the wall or trellis; standard or bush trees so affected should also be similarly dressed after the fall of the leaf.

THE WALTER SCOTT PUBLISHING CO., LTD., NEWCASTLE-ON-TYNE.

Crown 8vo, about 350 pp. each, Cloth Cover, 2/6 per Vol.;
Half-Polished Morocco, Gilt Top, 5s.

Count Tolstoy's Works.

The following Volumes are already issued—

A RUSSIAN PROPRIETOR.
THE COSSACKS.
IVAN ILYITCH, AND OTHER
STORIES.
MY RELIGION.
LIFE.
MY CONFESSION.
CHILDHOOD, BOYHOOD,
YOUTH.
THE PHYSIOLOGY OF WAR.
ANNA KARÉNINA. 3/6.

WHAT TO DO?
WAR AND PEACE. (4 vols.)
THE LONG EXILE, ETC.
SEVASTOPOL.
THE KREUTZER SONATA, AND
FAMILY HAPPINESS.
THE KINGDOM OF GOD IS
WITHIN YOU.
WORK WHILE YE HAVE THE
LIGHT.
THE GOSPEL IN BRIEF.

Uniform with the above—

IMPRESSIONS OF RUSSIA. By Dr. GEORG BRANDES.

Post 4to, Cloth, Price 1s.

PATRIOTISM AND CHRISTIANITY.

To which is added a Reply to Criticisms of the Work.

By COUNT TOLSTOY.

1/- Booklets by Count Tolstoy.

Bound in White Grained Boards, with Gilt Lettering.

WHERE LOVE IS, THERE GOD
IS ALSO.
THE TWO PILGRIMS.
WHAT MEN LIVE BY.

THE GODSON.
IF YOU NEGLECT THE FIRE,
YOU DON'T PUT IT OUT.
WHAT SHALL IT PROFIT A MAN?

2/- Booklets by Count Tolstoy.

NEW EDITIONS, REVISED.

Small 12mo, Cloth, with Embossed Design on Cover, each containing
Two Stories by Count Tolstoy, and Two Drawings by
H. R. Millar. In Box, Price 2s. each.

Volume I. contains—
WHERE LOVE IS, THERE GOD
IS ALSO.
THE GODSON.

Volume II. contains—
WHAT MEN LIVE BY.
WHAT SHALL IT PROFIT A
MAN?

Volume III. contains—
THE TWO PILGRIMS.
IF YOU NEGLECT THE FIRE,
YOU DON'T PUT IT OUT.

Volume IV. contains—
MASTER AND MAN.

Volume V. contains—
TOLSTOY'S PARABLES.

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING-ON-TYNE.

THE CONTEMPORARY SCIENCE SERIES.

Edited by HAVELOCK ELLIS.

NEW VOLUMES. Crown 8vo, Cloth, Price 6s.

A STUDY OF RECENT EARTHQUAKES.

By CHARLES DAVISON, D.Sc., F.G.S., Author of "The Hereford Earthquake of December 17th, 1896."

The aim of the author, who is a leading authority on this subject, is to provide a series of studies of a few earthquakes that have been investigated recently by scientific methods—such as the Neapolitan earthquake of 1857, the Ischian earthquakes of 1881 and 1883, the Charleston earthquake of 1886, the Riviera earthquake of 1887, the Japanese earthquake of 1891, the Hereford earthquake of 1896, the Indian earthquake of 1897, etc.

Crown 8vo, Cloth, Price 6s.

MORALS: Their Psycho-Sociological Bases.

Translated from the French of Duprat's *La Morale*,

By W. J. GREENSTREET, M.A., Headmaster of Marling School.

The field of psychological research has been widened by the triple alliance of psychology, physiology, and sociology—an alliance at once of the most intimate and fundamental nature, and productive of far-reaching results. It need, therefore, occasion no surprise that among the volumes of a scientific series is to be found a treatise dealing with ethical questions. Recent works on ethics have not been numerous, and the writers seem more anxious to soar into the realm of lofty thought than to lay the foundations of work that will be positive and lasting. It would seem that the time has come for a system of ethics less ambitious in its aims, more restricted in its scope, and based on a more rigorous method of treatment.

Crown 8vo, Cloth, Price 6s.

THE MAKING OF CITIZENS: A Study in Comparative Education.

By R. E. HUGHES, M.A., B.Sc., Author of "Schools at Home and Abroad."

It is instructive and interesting to have a complete and comprehensive account of both our own and foreign systems of education, based upon an exhaustive study of authoritative and official data. Mr. Hughes has set himself the task of showing in detail and by a series of pictures, so to speak, what the four leading nations of the world—England, France, Germany, and America—are doing in the way of manufacturing citizens. The primary and secondary systems are described in detail, and the social problems of national education are described and diagnosed.

Crown 8vo, Cloth, Price 6s. With 12 Portraits.

History of Geology and Palæontology to the end of the Nineteenth Century.

By KARL VON ZITTEL, Professor of Geology in the University of Munich.

Translated by MARIE M. OGILVIE-GORDON, D.Sc., Ph.D.

This work is recognised as the most complete and authoritative history of geology. It is brought down to the end of the nineteenth century. With the author's advice and assistance the work has been slightly abridged by the omission of the less generally interesting matter.

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING-ON-TYNE.

The Makers of British Art.

A NEW SERIES OF MONOGRAPHS OF BRITISH PAINTERS.

Each volume illustrated with Twenty Full-page Reproductions
and a Photogravure Portrait.

Square Crown 8vo, Cloth, Gilt Top, Deckled Edges, 3s. 6d. net.

VOLUMES READY.

LANDSEER, SIR EDWIN. By JAMES A. MANSON.

"This little volume may rank as the most complete account of Landseer that the world is likely to possess."—*Times*.

REYNOLDS, SIR JOSHUA. By ELSA D'ESTERRE-KEELING.

"To the series entitled 'The Makers of British Art' Miss Elsa d'Esterre-Keeling contributes an admirable little volume on Sir Joshua Reynolds. Miss Keeling's style is sprightly and epigrammatic, and her judgments are well considered."—*Daily Telegraph*.

TURNER, J. M. W. By ROBERT CHIGNELL, Author of
"The Life and Paintings of Vicat Cole, R.A."

ROMNEY, GEORGE. By SIR HERBERT MAXWELL, Bart.,
F.R.S., M.P.

"Likely to remain the best account of the painter's life."—*Athenaeum*.

WILKIE, SIR DAVID. By Professor BAYNE.

CONSTABLE, JOHN. By the Right Hon. LORD WINDSOR.

RAEBURN, SIR HENRY. By EDWARD PINNINGTON.

GAINSBOROUGH, THOMAS. By A. E. FLETCHER.

HOGARTH, WILLIAM. By Prof. G. BALDWIN BROWN.

MOORE, HENRY. By FRANK J. MACLEAN.

LEIGHTON, LORD. By EDGCUMBE STALEY.

IN PREPARATION.

MILLAIS—MORLAND—Etc.

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING-ON-TYNE.

The Scott Library.

Maroon Cloth, Gilt. Price **1s.** net per Volume.

May also be had in the following Bindings:—Half-Morocco, gilt top, antique; Red Roan, gilt edges, etc.

VOLUMES ALREADY ISSUED—

ARISTOTLE'S ETHICS
ATHENIAN ORACLE, THE
AUGUSTINE'S CONFESSIONS
BACON'S ESSAYS
BALZAC'S SHORTER STORIES
BRONTË'S JANE EYRE
BROWNE'S RELIGIO MEDICI,
Etc.
BURNS'S LETTERS
BYRON'S LETTERS
CARLETON, TALES FROM
CARLYLE'S MISCELLANEOUS ESSAYS
CARLYLE'S SARTOR RESARTUS
CHESTERFIELD'S LETTERS
CICERO, ORATIONS OF
COLERIDGE, PROSE OF
CUNNINGHAM'S GREAT
ENGLISH PAINTERS
DARWIN'S CORAL-REEFS
DAVIS, THOMAS, PROSE
WRITINGS OF
DEFOE'S CAPTAIN SINGLETON
DE MUSSET'S COMEDIES
DE QUINCEY'S CONFESSIONS
DE QUINCEY'S ESSAYS
DESCARTES' DISCOURSE ON
METHOD
DICKENS'S MASTER HUMPHREY'S CLOCK, Etc.
EARLY REVIEWS OF GREAT
WRITERS
ELIZABETHAN ENGLAND
ELLIS'S NEW SPIRIT
EMERSON, SELECT WRITINGS OF
ENGLISH FAIRY AND FOLK
TALES

ENGLISH PROSE (Maundeville
to Thackeray)
EPICETUS, TEACHING OF
FERRIS'S GREAT MUSICAL
COMPOSERS
FROISSART, PASSAGES FROM
FROUDE'S NEMESIS OF FAITH
GOETHE'S MAXIMS, Etc.
GOGOL'S INSPECTOR-
GENERAL
GOLDSMITH'S VICAR OF
WAKEFIELD
GOSSE'S NORTHERN
STUDIES
HAZLITT, WILLIAM, ESSAYS
HEINE IN ART AND
LETTERS
HEINE, HEINRICH, PROSE
HEINE'S ITALIAN TRAVEL
SKETCHES
HELPS'S ESSAYS AND
APHORISMS
HERBERT'S, LORD, AUTO-
BIOGRAPHY
HOLMES' AUTOCRAT OF THE
BREAKFAST-TABLE
HOLMES' POET AT THE
BREAKFAST-TABLE
HOLMES' PROFESSOR AT
THE BREAKFAST-TABLE
HUME'S ESSAYS
HUNT, LEIGH, ESSAYS BY
IBSEN'S PILLARS OF SOCIETY
IRISH FAIRY AND FOLK TALES
JERROLD, DOUGLAS, PAPERS
JOHNSON'S, DR., ESSAYS
KÂLIDASÂ'S SAKUNTALÂ
LAMB'S ESSAYS OF ELIA
LAMB'S PLAYS AND DRAMA-
TIC ESSAYS

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING-ON-TYNE.

THE SCOTT LIBRARY—*continued.*

LANDOR'S IMAGINARY CON-
 VERSATIONS
 LANDOR'S PENTAMERON, &c.
 LANDOR'S PERICLES AND
 ASPASIA
 LEOPARDI'S THOUGHTS AND
 DIALOGUES
 LESSING'S LAOCOON, AND
 OTHER WRITINGS
 LESSING'S NATHAN THE
 WISE
 LEWES'S, G. H., PRINCIPLES
 OF SUCCESS IN LITERA-
 TURE
 LONGFELLOW'S PROSE
 LOWELL'S ESSAYS ON ENG-
 LISH POETS
 LOWELL'S BIGLOW PAPERS
 LOWELL'S MY STUDY
 WINDOWS
 MAETERLINCK, PLAYS OF
 MALORY'S KING ARTHUR
 MALORY'S MARVELLOUS AD-
 VENTURES
 MARCUS AURELIUS, MEDI-
 TATIONS OF
 MAZZINI'S ESSAYS—POLITI-
 CAL, Etc.
 MILL'S LIBERTY
 MILTON, PROSE OF
 MITFORD'S OUR VILLAGE
 MONTAIGNE, ESSAYS OF
 MORE'S UTOPIA AND
 EDWARD V.
 MORRIS'S VOLSUNGS AND
 NIBLUNGS
 NEWMAN'S SELECT ESSAYS
 NEWMAN'S UNIVERSITY
 SKETCHES
 OXFORD MOVEMENT, THE
 PASCAL, BLAISE, SELECT
 THOUGHTS OF
 PLATO, SELECTIONS FROM
 PLATO'S REPUBLIC
 PLUTARCH'S LIVES
 PLINY'S LETTERS—SERIES I.
 PLINY'S LETTERS—SERIES II.
 POE'S TALES AND ESSAYS
 POLITICAL ECONOMY SELEC-
 TIONS
 POLITICAL ORATIONS

REFLECTIONS ON THE REVO-
 LUTION IN FRANCE
 RENAN'S LIFE OF JESUS
 RENAN'S ANTICHRIST
 RENAN'S MARCUS AURELIUS
 RENAN'S POETRY OF CELTIC
 RACES, Etc.
 REYNOLDS'S, SIR JOSHUA,
 DISCOURSES
 SADI: GULISTAN; OR,
 FLOWER GARDEN
 SAINTE-BEUVE, ESSAYS OF
 SCHILLER'S MAID OF OR-
 LEANS
 SCHILLER'S WILLIAM TELL
 SCHOPENHAUER
 SCOTS ESSAYISTS
 SENECA'S MORALS, SELEC-
 TIONS FROM
 SHELLEY'S ESSAYS AND
 LETTERS
 SHERIDAN'S PLAYS
 SMITH, SYDNEY, PAPERS BY
 SPENCE'S ANECDOTES AND
 OBSERVATIONS
 STEELE AND ADDISON,
 PAPERS OF
 SWIFT'S PROSE WRITINGS
 TACITUS, THE ANNALS OF
 THACKERAY'S BARRY LYN-
 DON
 THOREAU'S ESSAYS, AND
 OTHER WRITINGS
 THOREAU'S WALDEN
 THOREAU'S WEEK ON THE
 CONCORD
 TOLSTOY'S WHAT IS ART?
 VASARI'S LIVES OF ITALIAN
 PAINTERS
 WALTON'S COMPLETE
 ANGLER
 WALTON'S LIVES
 WHITE'S NATURAL HISTORY
 OF SELBORNE
 WHITMAN'S DEMOCRATIC
 VISTAS
 WHITMAN'S SPECIMEN DAYS
 WOLLSTONECRAFT'S RIGHTS
 OF WOMAN
 WORDSWORTH'S PROSE

The Canterbury Poets.

EDITED BY WILLIAM SHARP. Cloth, Cut and Uncut Edges, 1s.; Red Roan, Gilt Edges, 2s. 6d.; Pad. Morocco, Gilt Edges, 5s.

A Superior Edition Bound in Art Linen, with Photogravure Frontispiece, 2s.

- | | |
|----------------------------------|---------------------------|
| 1 CHRISTIAN YEAR | 25 HOGG |
| 2 COLERIDGE | 26 GOLDSMITH |
| 3 LONGFELLOW | 27 LOVE LETTERS, etc. |
| 4 CAMPBELL | 28 SPENSER |
| 5 SHELLEY | 29 CHILDREN OF THE POETS |
| 6 WORDSWORTH | 30 JONSON |
| 7 BLAKE | 31 BYRON. Miscellaneous |
| 8 WHITTIER | 32 BYRON. Don Juan |
| 9 POE | 33 THE SONNETS OF EUROPE |
| 10 CHATTERTON | 34 RAMSAY |
| 11 BURNS. Songs | 35 DOBELL |
| 12 BURNS. Poems | 36 POPE |
| 13 MARLOWE | 37 HEINE |
| 14 KEATS | 38 BEAUMONT & FLETCHER |
| 15 HERBERT | 39 BOWLES, LAMB, etc. |
| 16 HUGO | 40 SEA MUSIC |
| 17 COWPER. | 41 EARLY ENGLISH POETRY |
| 18 SHAKESPEARE'S POEMS, etc. | 42 HERRICK |
| 19 EMERSON | 43 BALLADES AND RONDEAUS |
| 20 SONNETS OF THIS CEN-
TURY | 44 IRISH MINSTRELSY |
| 21 WHITMAN | 45 MILTON'S PARADISE LOST |
| 22 SCOTT. Lady of the Lake, etc. | 46 JACOBITE BALLADS |
| 23 SCOTT. Marmion, etc. | 47 DAYS OF THE YEAR |
| 24 PRAED | 48 AUSTRALIAN BALLADS |
| | 49 MOORE |

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING-ON-TYNE.

The Canterbury Poets—*continued.*

- | | |
|-------------------------------|--|
| 50 BORDER BALLADS | 79 GERMAN BALLADS |
| 51 SONG-TIDE | 80 SONGS OF BERANGER |
| 52 ODES OF HORACE | 81 RODEN NOEL'S POEMS |
| 53 OSSIAN | 82 SONGS OF FREEDOM |
| 54 FAIRY MUSIC | 83 CANADIAN POEMS |
| 55 SOUTHEY | 84 CONTEMPORARY SCOT-
TISH VERSE |
| 56 CHAUCER | 85 POEMS OF NATURE |
| 57 GOLDEN TREASURY | 86 CRADLE SONGS |
| 58 POEMS OF WILD LIFE | 87 BALLADS OF SPORT |
| 59 PARADISE REGAINED | 88 MATTHEW ARNOLD |
| 60 CRABBE | 89 CLOUGH'S BOTHIE |
| 61 DORA GREENWELL | 90 BROWNING'S POEMS
Pippa Passes, etc. Vol. 1. |
| 62 FAUST | 91 BROWNING'S POEMS
A Blot in the 'Scutcheon, etc.
Vol. 2. |
| 63 AMERICAN SONNETS | 92 BROWNING'S POEMS
Dramatic Lyrics. Vol. 3. |
| 64 LANDOR'S POEMS | 93 MACKAY'S LOVER'S MIS-
SAL |
| 65 GREEK ANTHOLOGY | 94 HENRY KIRKE WHITE |
| 66 HUNT AND HOOD | 95 LYRA NICOTIANA |
| 67 HUMOROUS POEMS | 96 AURORA LEIGH |
| 68 LYTTON'S PLAYS | 97 TENNYSON'S POEMS
In Memoriam, etc. |
| 69 GREAT ODES | 98 TENNYSON'S POEMS
The Princess, etc. |
| 70 MEREDITH'S POEMS | 99 WAR SONGS |
| 71 IMITATION OF CHRIST | 100 JAMES THOMSON |
| 72 NAVAL SONGS | 101 ALEXANDER SMITH |
| 73 PAINTER POETS | 102 EUGÈNE LEE-HAMILTON |
| 74 WOMEN POETS | 103 PAUL VERLAINE |
| 75 LOVE LYRICS | |
| 76 AMERICAN HUMOROUS
VERSE | |
| 77 SCOTTISH MINOR POETS | |
| 78 CAVALIER LYRISTS | |

Ibsen's Prose Dramas.

EDITED BY WILLIAM ARCHER.

Complete in Five Vols. Crown 8vo, Cloth, Price 3s. 6d. each.
Set of Five Vols., in Case, 17s. 6d.; in Half Morocco, in
Case, 32s. 6d.

VOL. I.

"A DOLL'S HOUSE," "THE LEAGUE OF YOUTH,"
AND "THE PILLARS OF SOCIETY."

With Portrait of the Author, and Biographical Introduction by
WILLIAM ARCHER.

VOL. II.

"GHOSTS," "AN ENEMY OF THE PEOPLE," AND
"THE WILD DUCK."

With an Introductory Note.

VOL. III.

"LADY INGER OF ÖSTRÅT," "THE VIKINGS AT
HELGELAND," AND "THE PRETENDERS."

With an Introductory Note.

VOL. IV.

"EMPEROR AND GALILEAN."

With an Introductory Note by WILLIAM ARCHER.

VOL. V.

"ROSMERSHOLM," "THE LADY FROM THE SEA,"
AND "HEDDA GABLER."

Translated by WILLIAM ARCHER. With an Introductory Note.

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING-ON-TYNE.

Great Writers

A NEW SERIES OF CRITICAL BIOGRAPHIES.

EDITED BY ERIC ROBERTSON AND FRANK T. MARZIALS.

A Complete Bibliography to each Volume, by J. P. ANDERSON, British Museum, London.

Cloth, Uncut Edges, Gilt Top. Price 1s. 6d.

VOLUMES ALREADY ISSUED.

- LIFE OF LONGFELLOW. By Professor ERIC S. ROBERTSON.
LIFE OF COLERIDGE. By HALL CAINE.
LIFE OF DICKENS. By FRANK T. MARZIALS.
LIFE OF DANTE GABRIEL ROSSETTI. By J. KNIGHT.
LIFE OF SAMUEL JOHNSON. By Colonel F. GRANT.
LIFE OF DARWIN. By G. T. BETTANY.
LIFE OF CHARLOTTE BRONTË. By A. BIRKELL.
LIFE OF THOMAS CARLYLE. By R. GARNETT, LL.D.
LIFE OF ADAM SMITH. By R. B. HALDANE, M.P.
LIFE OF KEATS. By W. M. ROSSETTI.
LIFE OF SHELLEY. By WILLIAM SHARP.
LIFE OF SMOLLETT. By DAVID HANNAY.
LIFE OF GOLDSMITH. By AUSTIN DOBSON.
LIFE OF SCOTT. By Professor YONGE.
LIFE OF BURNS. By Professor BLACKIE.
LIFE OF VICTOR HUGO. By FRANK T. MARZIALS.
LIFE OF EMERSON. By RICHARD GARNETT, LL.D.
LIFE OF GOETHE. By JAMES SIME.
LIFE OF CONGREVE. By EDMUND GOSSE.
LIFE OF BUNYAN. By Canon VENABLES.
LIFE OF CRABBE. By T. E. KEEBEL.
LIFE OF HEINE. By WILLIAM SHARP.
LIFE OF MILL. By W. L. COURTNEY.
LIFE OF SCHILLER. By HENRY W. NEVINSON.
LIFE OF CAPTAIN MARRYAT. By DAVID HANNAY.
LIFE OF LESSING. By T. W. ROLLESTON.
LIFE OF MILTON. By R. GARNETT, LL.D.
LIFE OF BALZAC. By FREDERICK WEDMORE.
LIFE OF GEORGE ELIOT. By OSCAR BROWNING.
LIFE OF JANE AUSTEN. By GOLDWIN SMITH.
LIFE OF BROWNING. By WILLIAM SHARP.
LIFE OF BYRON. By Hon. RODEN NOEL.
LIFE OF HAWTHORNE. By MONCURE D. CONWAY.
LIFE OF SCHOPENHAUER. By Professor WALLACE.
LIFE OF SHERIDAN. By LLOYD SANDERS.
LIFE OF THACKERAY. By HERMAN MERIVALE and FRANK T. MARZIALS.
LIFE OF CERVANTES. By H. E. WATTS.
LIFE OF VOLTAIRE. By FRANCIS ESPINASSE.
LIFE OF LEIGH HUNT. By COSMO MONKHOUSE.
LIFE OF WHITTIER. By W. J. LINTON.
LIFE OF RENAN. By FRANCIS ESPINASSE.
LIFE OF THOREAU. By H. S. SALT.

LIBRARY EDITION OF 'GREAT WRITERS,' Demy 8vo, 2s. 6d.

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING ON-TYNE.

COMPACT AND PRACTICAL.

In Limp Cloth ; for the Pocket. Price One Shilling.

THE EUROPEAN CONVERSATION BOOKS.

FRENCH

ITALIAN

SPANISH

GERMAN

NORWEGIAN

CONTENTS.

Hints to Travellers—Everyday Expressions—Arriving at and Leaving a Railway Station—Custom House Enquiries—In a Train—At a Buffet and Restaurant—At an Hotel—Paying an Hotel Bill—Enquiries in a Town—On Board Ship—Embarking and Disembarking—Excursion by Carriage—Enquiries as to Diligences—Enquiries as to Boats—Engaging Apartments—Washing List and Days of Week—Restaurant Vocabulary—Telegrams and Letters, etc., etc.

The contents of these little handbooks are so arranged as to permit direct and immediate reference. All dialogues or enquiries not considered absolutely essential have been purposely excluded, nothing being introduced which might confuse the traveller rather than assist him. A few hints are given in the introduction which will be found valuable to those unaccustomed to foreign travel.

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING-ON-TYNE.

NEW ENGLAND LIBRARY.

GRAVURE EDITION.

PRINTED ON ANTIQUE PAPER. 2s. 6d. PER VOL.

Each Volume with a Frontispiece in Photogravure.

By NATHANIEL HAWTHORNE.

THE SCARLET LETTER.
THE HOUSE OF THE SEVEN GABLES.
THE BLITHEDALE ROMANCE.
TANGLEWOOD TALES.
TWICE-TOLD TALES.
A WONDER-BOOK FOR GIRLS AND BOYS.
OUR OLD HOME.
MOSSSES FROM AN OLD MANSE.
THE SNOW IMAGE.
TRUE STORIES FROM HISTORY AND BIOGRAPHY.
THE NEW ADAM AND EVE.
LEGENDS OF THE PROVINCE HOUSE.

By OLIVER WENDELL HOLMES.

THE AUTOCRAT OF THE BREAKFAST-TABLE.
THE PROFESSOR AT THE BREAKFAST-TABLE.
THE POET AT THE BREAKFAST-TABLE.
ELSIE VENNER.

By HENRY THOREAU.

ESSAYS AND OTHER WRITINGS.
WALDEN; OR, LIFE IN THE WOODS.
A WEEK ON THE CONCORD.

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING-ON-TYNE.

EVERY-DAY HELP SERIES

OF USEFUL HANDBOOKS. Price 6d. each,

OR IN ROAN BINDING, PRICE 1s.

Contributors—J. LANGDON DOWN, M.D., F.R.C.P.; HENRY POWER, M.B., F.R.C.S.; J. MORTIMER-GRANVILLE, M.D.; J. CRICHTON BROWNE, M.D., LL.D.; ROBERT FARQUHARSON, M.D. Edin.; W. S. GREENFIELD, M.D., F.R.C.P.; and others.

1. **How to Do Business.** A Guide to Success in Life.
2. **How to Behave.** Manual of Etiquette and Personal Habits.
3. **How to Write.** A Manual of Composition and Letter Writing.
4. **How to Debate.** With Hints on Public Speaking.
5. **Don't:** Directions for avoiding Common Errors of Speech.
6. **The Parental Don't:** Warnings to Parents.
7. **Why Smoke and Drink.** By James Parton.
8. **Elocution.** By T. R. W. Pearson, M.A., of St. Catharine's College, Cambridge, and F. W. Waithman, Lecturers on Elocution.
9. **The Secret of a Clear Head.**
10. **Common Mind Troubles.**
11. **The Secret of a Good Memory.**
12. **Youth: Its Care and Culture.**
13. **The Heart and its Function.**
14. **Personal Appearances in Health and Disease**
15. **The House and its Surroundings.**
16. **Alcohol: Its Use and Abuse.**
17. **Exercise and Training.**
18. **Baths and Bathing.**
19. **Health in Schools.**
20. **The Skin and its Troubles.**
21. **How to make the Best of Life.**
22. **Nerves and Nerve-Troubles.**
23. **The Sight, and How to Preserve It.**
24. **Premature Death: Its Promotion and Prevention.**
25. **Change, as a Mental Restorative.**
26. **The Gentle Art of Nursing the Sick.**
27. **The Care of Infants and Young Children.**
28. **Invalid Feeding, with Hints on Diet.**
29. **Every-day Ailments, and How to Treat Them.**
30. **Thrifty Housekeeping.**
31. **Home Cooking.**
32. **Flowers and Flower Culture.**
33. **Sleep and Sleeplessness.**
34. **The Story of Life.**
35. **Household Nursing.**

THE WALTER SCOTT PUBLISHING CO., LTD.,

LONDON AND FELLING-ON TYNE

The Music Story Series.

A SERIES OF LITERARY-MUSICAL MONOGRAPHS.

Edited by FREDERICK J. CROWEST,

Author of "The Great Tone Poets," etc., etc.

Illustrated with Photogravure and Collotype Portraits, Half-tone and Line Pictures, Facsimiles, etc.

Square Crown 8vo, Cloth, 3s. 6d. net.

VOLUMES NOW READY.

THE STORY OF ORATORIO. By ANNIE W. PATTERSON, B.A., Mus. Doc.

THE STORY OF NOTATION. By C. F. ABDY WILLIAMS, M.A., Mus. Bac.

THE STORY OF THE ORGAN. By C. F. ABDY WILLIAMS, M.A., Author of "Bach" and "Handel" ("Master Musicians' Series").

THE STORY OF CHAMBER MUSIC. By N. KILBURN, Mus. BAC. (Cantab.), Conductor of the Middlesbrough, Sunderland, and Bishop Auckland Musical Societies.

THE STORY OF THE VIOLIN. By PAUL STOEVIING, Professor of the Violin, Guildhall School of Music, London.

THE STORY OF THE HARP. By WILLIAM H. GRATTAN FLOOD, Author of "History of Irish Music."

THE STORY OF ORGAN MUSIC. By C. F. ABDY WILLIAMS, M.A., Mus. Bac.

THE STORY OF ENGLISH MUSIC (1604-1904): being the Worshipful Company of Musicians' Lectures.

IN PREPARATION.

THE STORY OF THE PIANOFORTE. By ALGERNON S. ROSE, Author of "Talks with Bandsmen."

THE STORY OF ENGLISH MINSTRELSY. By EDMOND-STOUNE DUNCAN.

THE STORY OF MUSICAL SOUND. By CHURCHILL SIBLEY, Mus. Doc.

THE STORY OF CHURCH MUSIC. By THE EDITOR.
ETC., ETC., ETC.

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING-ON-TYNE.

MUSICIANS' WIT, HUMOUR, AND ANECDOTE :

BEING *ON DITS* OF COMPOSERS, SINGERS, AND
INSTRUMENTALISTS OF ALL TIMES.

By **FREDERICK J. CROWEST,**

Author of "The Great Tone Poets," "The Story of British Music,"

Editor of "The Master Musicians" Series, etc., etc.

**Profusely Illustrated with Quaint Drawings by
J. P. DONNE.**

In One Volume—Crown 8vo, Cloth, Richly Gilt, Price 3/6.

Among the hundreds of stories abounding in wit and pointed repartee which the volume contains, will be found anecdotes of famous musicians of all countries and periods.

TOLSTOY: His Life and Works.

By **JOHN C. KENWORTHY,**

AN INTIMATE FRIEND OF THE GREAT RUSSIAN WRITER.

*One Volume, Crown 8vo, 256 pages, Richly Bound, containing
Portraits, Facsimile Letter, Views, etc.*

PRICE SIX SHILLINGS.

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING-ON-TYNE.

The Emerald Library.

Crown 8vo, Gilt Top, Half Bound in Dark Green Ribbed Cloth, with Light Green Cloth Sides, 2s. each.

Barnaby Rudge
Old Curiosity Shop
Pickwick Papers
Nicholas Nickleby
Oliver Twist
Martin Chuzzlewit
Sketches by Boz
Olive
The Ogilvies
Ivanhoe
Kenilworth
Jacob Faithful
Peter Simple
Paul Clifford
Eugene Aram
Ernest Maltravers
Alice; or, The Mysteries
Rienzi
Pelham
The Last Days of Pompeii
The Scottish Chiefs
Wilson's Tales
The Fair God
Miss Beresford's Mystery
A Mountain Daisy
Hazel; or, Perilpoint Lighthouse
Vicar of Wakefield
Prince of the House of David
Wide, Wide World
Village Tales
Ben-Hur
Uncle Tom's Cabin
Robinson Crusoe
The White Slave
Charles O'Malley
Midshipman Easy
Bride of Lammermoor
Heart of Midlothian
Last of the Barons
Old Mortality
Tom Cringle's Log
Cruise of the Midge
Colleen Bawn
Valentine Vox
Night and Morning
Bunyan
Foxe's Book of Martyrs
Mansfield Park
Last of the Mohicans
Poor Jack
The Lamplighter
Jane Eyre
Pillar of Fire
Throne of David
Dombey and Son
Vanity Fair
Infelice
Beulah
Harry Lorrequer
Essays of Elia
Sheridan's Plays
Waverley
Quentin Durward
Talisman
From Jest to Earnest
Knight of 19th Century

Caudle's Lectures
Jack Hinton
Bret Harte
Ingoldsby Legends
Handy Andy
Lewis Arundel
Guy Mannering
Rob Roy
Fortunes of Nigel
Man in the Iron Mask
Great Composers
Louise de la Valliere
Great Painters
Rory O'More
Arabian Nights
Swiss Family Robinson
Andersen's Fairy Tales
Three Musketeers
Twenty Years After
Vicomte de Bragelonne
Monte Cristo—Dantes
„, Revenge of Dantes
The Newcomes
Life of Robert Moffat
Life of Gladstone
Cranford
North and South
Life of Gen. Gordon
Lincoln and Garfield
Great Modern Women
Henry Esmond
Alton Locke
Life of Livingstone
Life of Grace Darling
White's Selborne
Tales of the Covenanters
Barriers Burned Away
Opening a Chestnut Burr
Pendennis
David Copperfield
Luck of Barry Lyndon
St. Elmo
Son of Porthos
Stanley and Africa
Life of Wesley
Life of Spurgeon
For Lust of Gold
 Wooing of Webster
At the Mercy of Tiberius
Countess of Rudolstadt
Consuelo
Two Years before the Mast
Fair Maid of Perth
Peveril of the Peak
Shirley
Queechy
Naomi; or, the Last Days of Jerusalem
Little Women and Good Wives
Hypatia
Villette
Ruth
Agatha's Husband
Head of the Family
Old Helmet
Bleak House
Cecil Dreeme
Melbourne House
Wuthering Heights

The Days of Bruce
The Vale of Cedars
Hunchback of Notre
Vashti (Dame)
The Caxtons
Harold, Last of the Saxon Kings
Toilers of the Sea
What Can She Do?
New Border Tales
Frank Fairleigh
Zanoni
Macaria
Inez
Conduct and Duty
Windsor Castle
Hard Times
Tower of London
John Halifax, Gentle-
Westward Ho! (man
Lavengro
It is Never Too Late to Mend
Two Years Ago
In His Steps
Crucifixion of Phillip Strong
His Brother's Keeper
Robert Hardy's Seven Days, and Malcom Kirk (in 1 vol.)
Richard Bruce
The Twentieth Door
House of the Seven Gables
Elsie Venner
The Roman Rye
Little Dorrit
The Scarlet Letter
Mary Barton
Home Influence
The Mother's Recompense
Tennyson's Poems
Harry Coverdale's Courtship
The Bible in Spain
Handbook of House-keeping
The Dead Secret
Queen Victoria
Martin Rattler
Ungava
The Coral Island
Adam Bede
The Young Fur-Traders
The Virginians
A Tale of Two Cities
Scenes of Clerical Life
The Mill on the Floss
Danesbury House
A Life for a Life
Christmas Books
Tom Brown's Schooldays
Grimm's Fairy Tales
East Lynne (Stress
Through Storm and
The Channings
Old St. Paul's (Hearth
The Cloister and the
Mrs. Halliburton's
Troubles.

THE WORLD'S GREAT NOVELS.

A series of acknowledged masterpieces by the most eminent writers of fiction. Excellent paper, large type, handsomely and strongly bound in Russia Red Cloth, these books are admirably suited either for presentation or for a permanent place in the Library, while the low price brings them within reach of every class of readers.

Large Crown 8vo. Hundreds of Pages. Numerous Illustrations.
3s. 6d. per Vol.

Adam Bede. By George Eliot. With Six Full-page Illustrations by S. H. Vedder and J. Jellicoe.

Anna Karenina. By Count Tolstoy. With Ten Illustrations by Paul Frénzeny, and a Frontispiece Portrait of Count Tolstoy.

David Copperfield. By Charles Dickens. With Forty Illustrations by Hablot K. Browne ("Phiz").

Ivanhoe. By Sir Walter Scott. With Eight Full-page Illustrations by Hugh M. Eaton.

Jane Eyre. By Charlotte Brontë. With Eight Full-page Illustrations, and Thirty-two Illustrations in the Text, and Photogravure Portrait of Charlotte Brontë.

John Halifax, Gentleman. By Mrs. Craik. With Eight Full-page Illustrations by Alice Barber Stephens.

Misérables, Les. By Victor Hugo. With Twelve Full-page Illustrations.

Notre Dame. By Victor Hugo. With many Illustrations.

Three Musketeers, The. By Alexandre Dumas. With Twelve Full-page Illustrations by T. Eyre Macklin.

Twenty Years After. By Alexandre Dumas. With numerous Illustrations.

Vicomte de Bragelonne, The. By Alexandre Dumas. With Eight Full-page Illustrations by Frank T. Merrill.

Louise de la Vallière. By Alexandre Dumas. With Eight Full-page Illustrations by Frank T. Merrill.

The Man in the Iron Mask. By Alexandre Dumas. With Eight Full-page Illustrations by Frank T. Merrill.

Count of Monte-Cristo, The. By Alexandre Dumas. With Sixteen Full-page Illustrations by Frank T. Merrill.

Chicot, the Jester (La Dame de Monsoreau). By Alexandre Dumas. New and Complete Translation. With Nine Full-page Illustrations by Frank T. Merrill.

Marguerite de Valois. By Alexandre Dumas. New and Complete Translation. With Nine Illustrations by Frank T. Merrill.

Forty-Five Guardsmen, The. By Alexandre Dumas. New and Complete Translation. With Nine Illustrations by Frank T. Merrill.

War and Peace. By Count Tolstoy. Two Volumes. With Five Full-page Illustrations by E. H. Garrett.

THE WALTER SCOTT PUBLISHING COMPANY, LIMITED,
LONDON AND FELLING-ON-TYNE.

CAGE

7 DAY USE

RETURN TO DESK FROM WHICH BORROWED

Agriculture Library

This publication is due on the LAST DATE
stamped below.

~~MAY 27 1963~~

RB 17-60m-8,'61
(C1641s10)4188

General Library
University of California
Berkeley

L 4

YB 47637

9/16

L

